ENGINEERING NEWS-RECORD

APRIL 19, 1945

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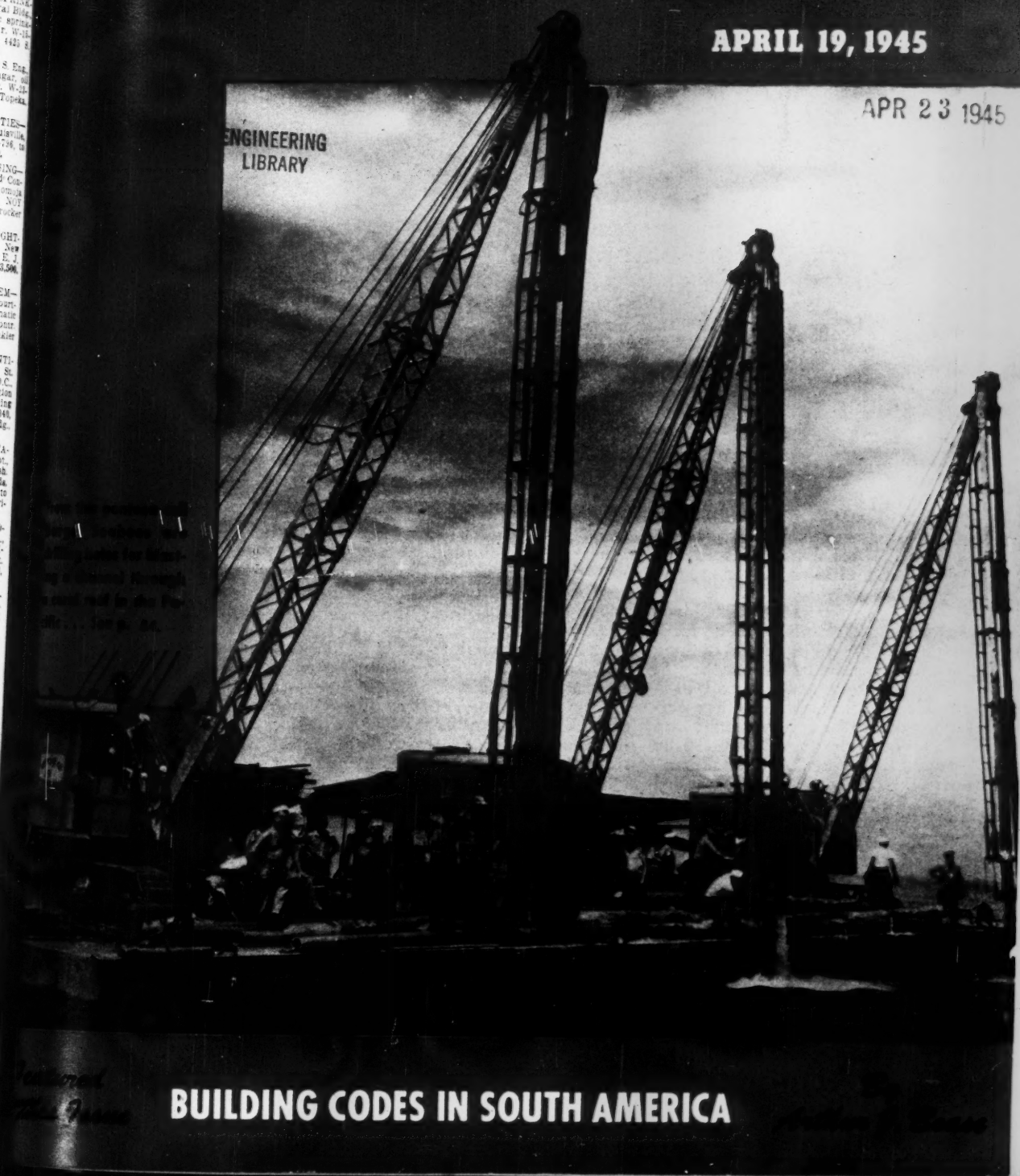
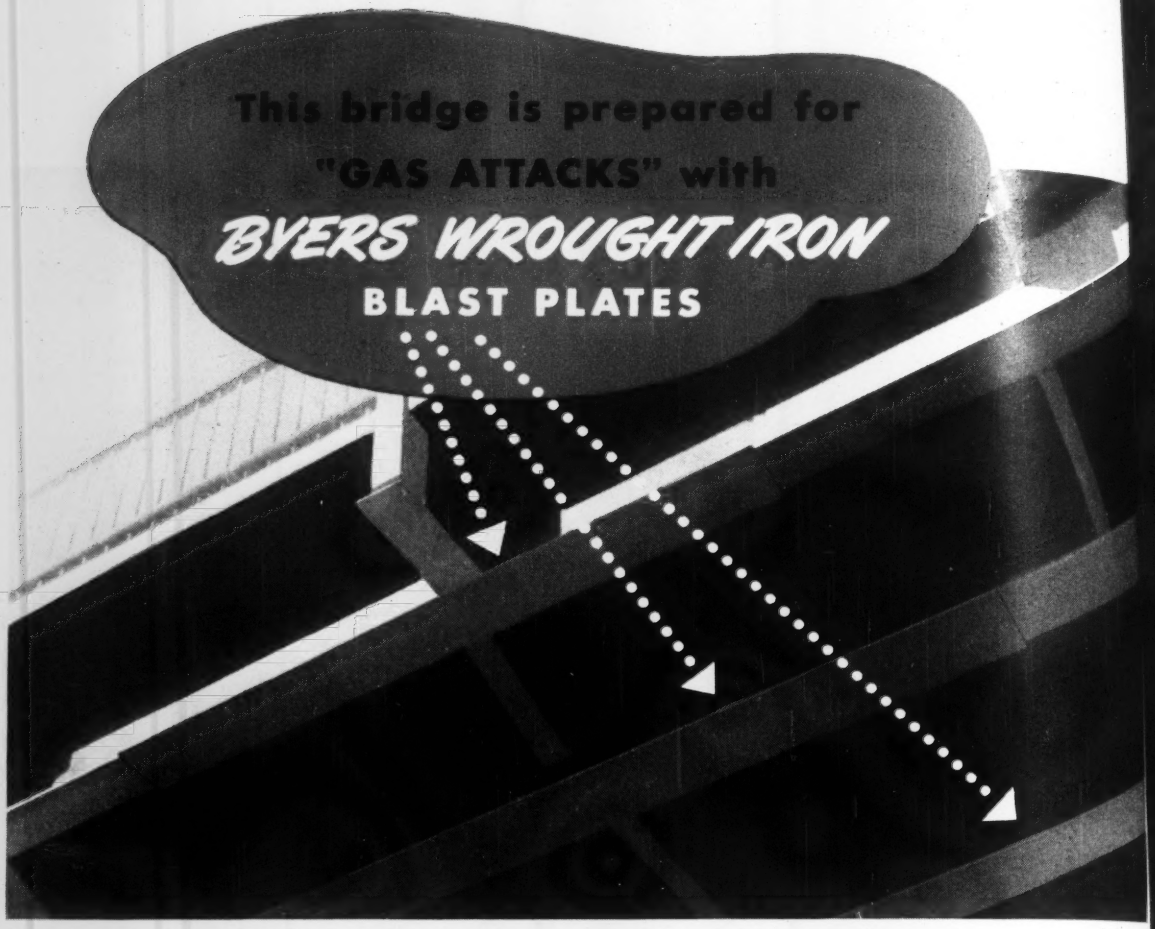


BUILDING CODES IN SOUTH AMERICA



This bridge at St. Johnsbury, Vermont, provides an excellent example of balanced design to equalize the life of all parts of the structure.

The bridge crosses a river, highways, and a railroad. Since locomotive blast gases would reduce the initial strength and section of the span over the railroad at a faster rate than that of other portions of the bridge, wrought iron blast plates were used to shield the vulnerable parts. As the illustration shows, the plates were applied as "reinforcing" directly to the bridge members themselves, rather than parallel to the tracks.

The reason why wrought iron's protection is necessary lies in the combination of sand-blasting action, rapid temperature fluctuations, and corrosive attack that the locomotive blasts cause. These hot gases, striking a cold plate, raise local areas to high temperatures and set up strains that only a tough material can endure. Then cinders, emerging at high velocity from the stack, tend to scour off any protective film formed on the metal, leaving it exposed to attack by the carbon and sulfur acids formed when combustion products are absorbed by moisture. Wrought iron has proven itself highly resistive to all these and is the preferred material.

The reason that wrought iron lasts so long and so well in this severe service is found in its unique structure. The tiny fibers of glass-like silicate slag that are threaded through the body of high-purity iron "baffle" corrosion, and force it to diffuse over the surface. These fibers also provide a firmer anchorage for the initial protective scale, which shields the underlying metal. Wrought iron is of course highly malleable and ductile, and so can withstand temperature fluctuations that would destroy less durable materials. In addition to all this, the fibers give wrought iron something of the character of a stranded wire cable, making it unusually resistive to vibration when this is a factor to be reckoned with.

You will find installation and service records as well as details of the methods of fastening used by various engineers, in our bulletin, "Wrought Iron in Bridge Construction." We will be glad to send you a copy.

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JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

ol. 134 APRIL 19, 1945 No. 16

OMING NEXT

Waterworks men will find a wide riety of articles in the May 3 issue flecting current developments. The bjects include pre-stressing of con-ete tanks, cleaning filter sand, steel pe anchorages, Seabee treatment cilities, supplies on the Inter-merican Highway, precasting of anholes and selection of econom-al pipe sizes.

In Waldo Bowman's report from e European Theater of Operations "Engineer Preparations for the hine Offensive" published in the pril 5 issue, he told of the crossing the Roer and the drive to the hine. In the report to be published ay 3, he writes of the Rhine itself the shambles the Germans made of s great bridges, our plans for cross-g it, the assaults that carried us to s eastern bank and the subsequent idging operations. Not only does bring this great military engineer-g operation into proper focus, but provides much useful background r an understanding of future work hat will be required along the great aterway.

• Although not originally built as emountables, the Federal Public Housing Authority has successfully ismantled 109 timber-framed houses, ransported them 260 miles to a new te and re-erected them to ease a ritical housing situation. The meth-ds used will be described in the May 3 issue.

LOOKING AHEAD

• Following Waldo Bowman's article n this issue, in which he tells the tory of how our American engineers uccessfully effected the Rhine cross-ngs, the May 17 issue will carry a tory describing the ingenious bridge uilding methods, the back-breaking oil and inspiring, effective leader-hip that kept our supply lines open rom Normandy to the Rhine.

• When municipal engineers in every tate are beset with so many prob-lems peculiar to a country at war, it s timely that an old-timer in this ield of engineering should offer ome of his 27 years of experience, ncluding many suggestions that ight help to give encouragement to hose who feel their burdens are lmost too much to bear. Such an rticle by P. L. Brockway, director f public service, Wichita, Kansas, s scheduled for an early issue.

	PAGE
The Week in Engineering and Construction	53
Comment and Discussion	60
Editorials	62
"Adsec"—Engineer Supply Organization.....W. G. BOWMAN	64
South American Building Codes.....A. J. BOASE	68
Chicago Plans an Eight-Lane Expressway	78
Oil Drums Buoy 1,700 Ft. of Pipe	80
We Bridge the River Seine.....COL. W. C. HALL	81
Submarine Drilling with Job-Assembled Rig.....N. A. BOWERS	84
Seabees Complete Difficult Welding Job	87
Emulsified Asphalt on Wet Coral	88
Demountable V-Type Railway Bridge.....T. JANISZEWSKI	90
Temperature Data on Virginia Streams	93
Stabilizing the Construction Industry.....BEARDSLEY RUML	94
Unit Prices	98
Elections and Activities	106
Men and Jobs	110
New Aids to the Constructor	114
Manufacturers' Activities	118
Construction Reports	153

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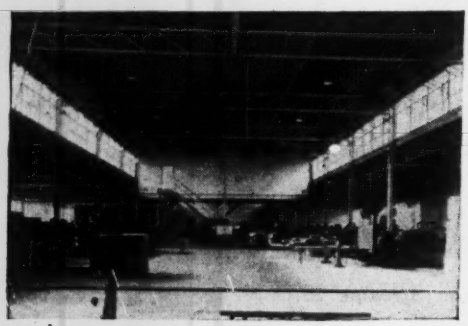
Clerespan Steel Joists will be available again just as soon as our wartime obligations are fulfilled. In the meantime, include them in your plans for postwar structures, where large, unobstructed floor areas are a prime requirement.



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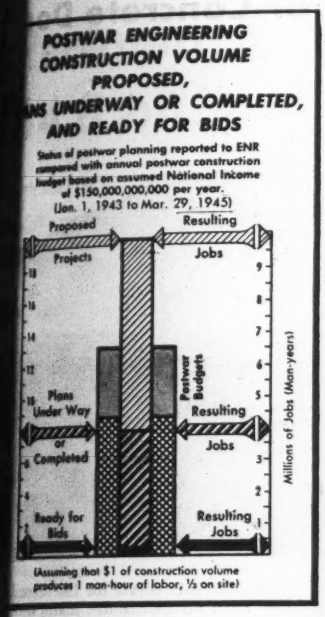
Postwar Planning Progress Report

WAR CONSTRUCTION planning in 27 ... from January 1943 through ... 1945 reached $19,737,841,000 ...roposed projects, and of this, $7,-...20,000, or 40 percent had plans ...er way or completed. This record ...ood insofar as the proposed and ...ning stage volumes are concerned. ... only $664,294,000 worth of proj... 8.5 percent of the planning stage ..., are ready for bids with planning ...pleted and all land, legal and financ... problems settled. Projects totaling another $361,663,000 have plans finished, but are held up by lack of financing, and an additional $405,614,000 worth of work has financing available, but planning is not yet complete.


POSTWAR ENGINEERING CONSTRUCTION VOLUME PROPOSED, ... UNDERWAY OR COMPLETED, AND READY FOR BIDS
Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.
(Jan. 1, 1943 to Mar. 29, 1945)
Proposed Projects
Resulting Jobs
Plans Under Way or Completed
Postwar Budgets
Resulting Jobs
Ready for Bids
Resulting Jobs
Millions of Jobs (Man-years)
(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

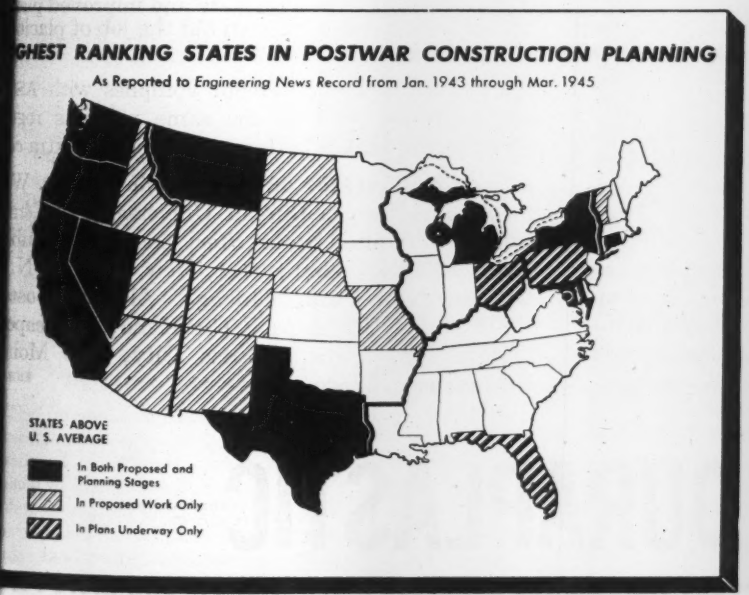
Geographical analysis of the postwar volume continues to reveal weakness in state distribution. In fact, the statement of a month ago that planning is confined to relatively few states is again appropriate, as the same states reported as above the per capita average in postwar planning progress in February are still the leaders in March.

Postwar planning in the eleven Southern states, with the exception of Florida, has not progressed satisfactorily. This region has 21.4 percent of the nation's population (1940 census), but in the 27-month period has reported only 8.6 percent of the U. S. total of proposed construction ($1,689,911,000 out of $19,-737,841,000), and only 5.9 percent of the country's planning stage volume ($462,761,000 out of $7,858,520,000).

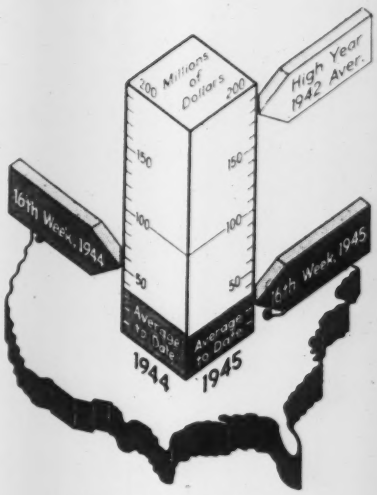
South's per capita volume of $59.80 for proposed work compares with $150.00 for the nation as a whole and is the lowest for any section. In the planning stage, South is again low, with a per capita volume of $16.40 compared with $59.70 for the entire country.

Federal work proposed for postwar construction reached $6,468,260,000 in the 27-month period, 33 percent of the overall total. Almost 78 percent of this federal volume, $5,038,692,000, is concentrated in the far west and west of the Mississippi states.

(*Postwar Project Reports page* 122)


GHEST RANKING STATES IN POSTWAR CONSTRUCTION PLANNING
As Reported to Engineering News Record from Jan. 1943 through Mar. 1945
STATES ABOVE U. S. AVERAGE
In Both Proposed and Planning Stages
In Proposed Work Only
In Plans Underway Only

CONSTRUCTION ACTIVITY



As Reported This Week to... *Engineering News-Record*

CONTRACT VOLUME

Continental U. S. Only (Thousands of Dollars)

	Week of Apr. 19 1945	Cumulative 1945 (16 wk.)	Cumulative 1944 (16 wk.)
Federal	$13,010	$279,407	$405,824
State & Municipal	3,040	56,444	44,781
Total Public	$16,050	$335,851	$450,605
Total Private	6,131	152,403	117,820
U. S. Total	$22,181	$488,254	$568,425

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Type of Work	Dollar Volume (Thousands) This Week	Cumulative 1945 (16 wk.)	Cumulative 1944 (16 wk.)
Waterworks	$1,194	$11,237	$7,580
Sewerage	534	9,252	7,077
Bridges	152	7,938	3,479
Highways	1,420	36,242	36,411
Earthwork, Waterways	405	10,973	19,803
Buildings, Public	5,331	200,245	246,938
Industrial	5,938	110,599	43,945
Commercial	166	25,970	62,388
Unclassified	7,041	75,798	140,804

NOTE: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1945 (16 wk.)	Cumulative 1944 (16 wk.)
NON-FEDERAL	$195,112	$158,806
Corporate Securities	43,254	69,319
State and Municipal	130,958	35,707
RFC Loans	20,900	53,780
FEDERAL	$ 77,137	$205,832
Total Capital	$272,249	$364,638

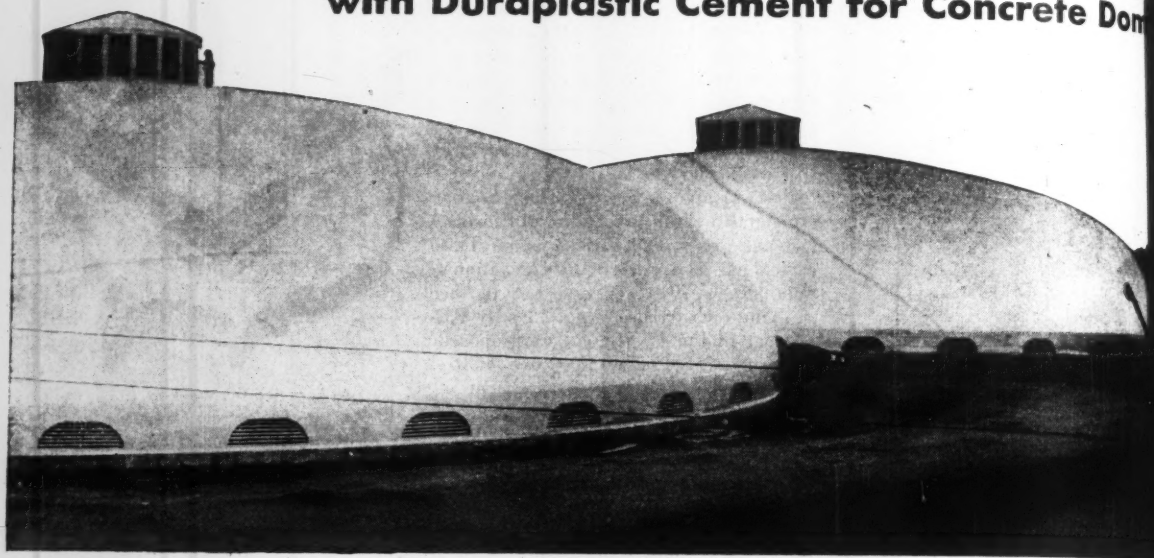
ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	Apr. '45	306.43	147.30
Building Cost	Apr. '45	238.46	128.90
Volume	Mar. '45	103	45

CONTRACTOR SAVES

BOTH TIME AND LABO

with Duraplastic Cement for Concrete Dom



Sewage disposal plant, Hibbing, Minn. To place the Duraplastic concrete for the second dome required only half the men and a third less time than on first dome, made with regular cement. Roberts & Schaefer Co., designers; J. C. Taylor, architect; Charles Foster, consulting engineer; E. W. Coons Co., Inc., contractor.

WHILE only recently announced, six years of gratifying field performance are back of Atlas Duraplastic, the new air-entraining portland cement that makes better concrete at no extra cost. Since 1939 it has been used for over 2½ million sq. yds. of paving and for a variety of building jobs throughout the country.

Because it makes concrete more workable, reduces segregation and bleeding, and spreads, screeds and finishes more easily, Duraplastic cement sometimes saves both time and money, as illustrated by the following example.

At the Hibbing, Minn., sewage disposal plant two trickling filters are covered with thin-shell concrete domes of similar dimensions. The contractor states that the thin shells (3½" to 6") and the heavy reinforcing required great care in placing the concrete.

ON THE FIRST DOME, built with regular cement, he used 28 men, additional foremen, and three days to place the concrete;

ON THE SECOND DOME, constructed with Duraplastic cement, there was considerably less segregation of the aggregate and improved plasticity. As a result, 13 men did the job of placing in two days.

Atlas Duraplastic cement complies with AST specifications, sells at the same price as regul cement, and makes better concrete at no extra co

Send for booklet on Duraplastic cement. Wri to Technical Service Bureau, Universal Atlas Cemen Company (United States Steel Corporation Subsi iary), 135 East 42nd Street, New York 17, N. Y Offices: New York, Chicago, Albany, Boston Philadelphia, Pittsburgh, Cleveland, Minneapoli Duluth, St. Louis, Kansas City, Des Moines Birmingham, Waco.

ENR-4-

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

The Air-Entraining Portland Cement That Makes Concrete More Durable and More Plasti

The Week In Engineering and Construction

GINEERING NEWS-RECORD • APRIL 19, 1945 • VOLUME 134 • NUMBER 16

Reclamation bureau plans $4.8 billion postwar work

Inventory consists of 415 jobs and includes more than 100 authorized projects costing 1.3 billion dollars; power production capacity to be doubled

postwar construction program ex-ed to cost $4,792,000,000 based on prices is now being planned for 17 ern states by the Bureau of amation, Commissioner Harry W. ore revealed last week. He made statement when testifying before House Irrigation and Reclamation mittee concerning a Bill (H. R.) that would give veterans a 90- preference in acquiring farms on amation projects. Planning is well anced for much of the work.

ast summer the bureau told Con-s that a program of 236 postwar jects requiring an expenditure of e three billion dollars was being nned (see *ENR* Sept. 7, 1944, vol. 263 for details and tables). Since n Congress has approved the Mis-ri River plans and several other jects. As a result, the list has en increased to 415 projects ex-ted to cost nearly five billion llars.

Of this total more than 100 projects ging from small pumping plants to errelated multiple-purpose projects estimated to cost about 1.3 billion llars already have been authorized Congress. Construction of these s would permit irrigation of about 00,000 additional acres of land and vide supplemental water for another 00,000 acres. The entire list of jects, including authorized work uld bring water to 10,809,000 acres d supplemental water for 10,617,000 es.

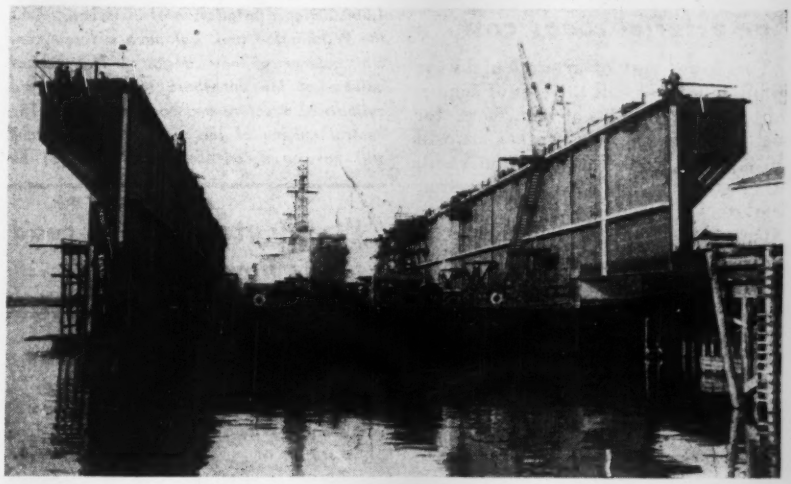
Big power program

The present capacity of bureau wer plants is now 2,440,000 kw. The thorized work will increase this ount to 4,863,000 kw., principally by ding generating units for which space s provided in original construction, ile the entire postwar inventory ings the total to 9,324,000 kw.

Provided with funds and manpower to complete field investigations and preconstruction work, plus appropriations for actual construction, the Bureau of Reclamation could put from 150,000 to 200,000 men to work at project sites during the first postwar year, Commissioner Bashore revealed. A peak employment of 400,000 workers on the project sites and 640,000 more men in mills and factories and on the transportation could be reached in the second or third years, he said. It is estimated that a total of about 1.6 billion man-hours of work would be required at the site and an additional 2.6 billion would be spent elsewhere.

The program announced last summer was considered a five-year plan. No time limit is set for that just described. Instead, the work would be carried out to relieve unemployment and might take as long as ten years or more.

Bureau of Reclamation engineers point out that the preparation of plans is progressing at a good rate, but that many designers and technicians are needed to make the progress desired. However, some men are now being released from construction projects under way during recent months as war food projects and power developments. These men are placed on planning, if at all possible, without a loss of time.



Three-piece yard-type floating drydock built by Kaiser

Built at the Kaiser Co. Vancouver, Wash., shipyard, a 14,000-ton lifting capacity three-piece floating drydock has been delivered to its permanent berth at Kaiser's Swan Island, Ore., yard. Shown above is the 4,000-ton center section of the three-piece dock which when completed will be 598-ft. long and have a lifting capacity of 14,000 tons.

End sections of the dock are much shorter than the center section and are used primarily for self-docking of the center by submergence, shifting to prepared positions under the center section and then pumping out to raise the center above the water. The end sections may be drydocked for repair by disengaging them from the center, turning them 90 deg., and floating them over the center section as the ship would be docked.

A second floating drydock under construction at Vancouver will be assigned to Consolidated Steel Corp. Ltd. at Wilmington, Calif., it is reported. Drydocks built by Kaiser for the Navy are being constructed under the Maritime Commission.

Model bridge for Rhine was set up on Columbia

Disclosure that U. S. Army Engineers practiced for months building and pushing a bridge across the Columbia River near Rufus, Ore., where the river and terrain resembles the Rhine and its environs, was made recently.

Beginning work on a pilot bridge last August, the Engineers devised a model capable of supporting a concentrated load of 54 tons which they could set up in about seven hours—the time it ultimately took them to bridge the Rhine.

The pilot bridge, on the basis of which a $12,000,000 contract for 4,000 aluminum pontoons was let to Kaiser's Oregon Shipbuilding Corp. last December, was worked out with a new scheme for connecting pontoon sections and embodied what has been described as "controlled articulation". This, according to Lt. Col. G. S. Witters who directed the operation, permitted distribution of concentrated weight over eight pontoons.

In perfecting the pilot model the Engineers cut 60-ft. pontoons in two so that the bridge could be transported over the rough terrain to be encountered.

• • •

N. Y. state to aid cities on arterial roads cost

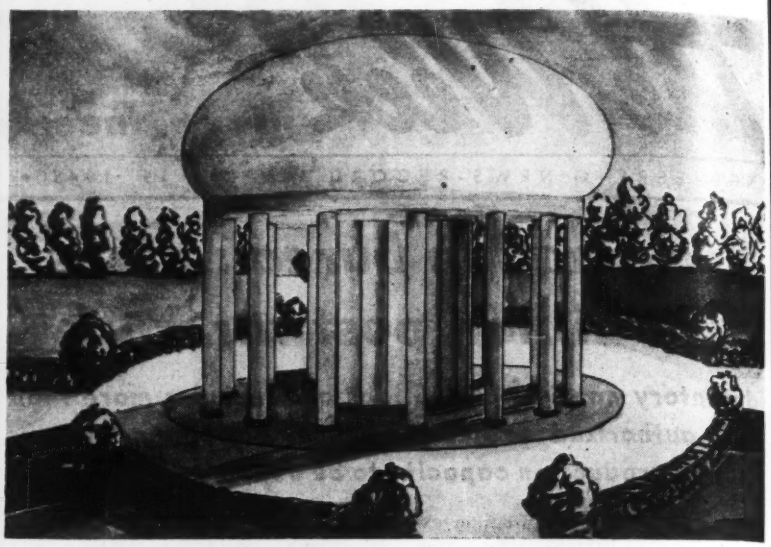
The entire cost of arterial highways within cities and half the cost of acquiring necessary rights-of-way there for such highways in New York state will be assumed by the state as the result of legislation signed by Governor Thomas E. Dewey on April 10. It is expected that the new law, the Seelye Act, eventually will save New York City about $60,000,000 and other cities of the state about $50,000,000.

The federal government has authorized federal aid on urban highways, including city routes in the state, to the extent of $55,000,000 over a three-year period. The state is matching that fund.

• • •

Fairbanks must continue to use cold water

Following disapproval of a $1,750,000 water and sewer project at Fairbanks, Alaska by the War Department, the Federal Works Agency has rescinded an allotment of $1,403,267 for its construction. The project had included construction of a boiler plant to heat the water to a point where it would flow easily through the distribution system in that cold climate. (*ENR* March 15, vol. p. 365.)



Water tank of new design for Washington

Work will start soon on the installation of a 2,000,000-gal. welded elevated water tank in Washington, D. C. Of spheroidal shape, the structure will be 106 ft. in diameter, and will be supported on sixteen 4-ft. dia. outer columns and one 40-ft. dia. fluted central column. The low water level will be 49 ft. above the ground and the tank will have a range in head of 34 ft. 6 in.

Although similar in overall design to a 1,000,000-gal. installation at Jonesboro, Ark., the Washington tank will have a large central column of new design. The central column of the Jonesboro tank is a simple cylindrical structure and contains water. The central column of the new Washington tank will have a fluted shape and will not be filled with water, a separate riser inside the shell providing a connection between the main body of the tank and the distribution system.

The tank will be built in the Anacostia section of Washington near the intersection of Alabama and Boulevard Avenues. The contract for the work, not including the foundations, has been awarded to the Chicago Bridge & Iron Co., represented in Washington by James C. Vosburgh.

H. Beckett is superintendent; Dave Auld, assistant superintendent; and R. L. Orndorff, engineer for the District of Columbia. R. M. Dowe, construction engineer will represent the Washington water department on the field work.

Washington county road funds now assured

County commissioners and good roads advocates in Washington state were pleased when Governor Mon C. Wallgren recently signed a bill providing much needed funds for county roads.

Under Washington's long-standing limitation of taxation by state and municipal governments to 40 mills on the dollar of assessed valuation in any one year, county road districts had been limited to what some commissioners regarded as a "starvation diet."

This measure more than trebles fund allocations for road construction by increasing the limitation on road district levies from three to ten mills. Its signing marked the successful conclusion of more than four years' efforts on the part of good roads groups to obtain additional funds for county-maintained roads through an enabling act empowering county officials to levy special road assessments.

Flash flood at Dallas causes much damage

On March 31, Dallas, Tex., had one of its worst flash floods in years due to sustained excessive rainfall. Damage to streets is estimated at $35,000, while damage to bridges in one section alone is estimated to be more than $25,000. In addition, many thousand dollars worth of damage to buildings resulted from backing up of sewage.

Emergency crews threw up levees to protect traffic moving along a traffic artery and through an underpass while capacity operation of three pump stations along the Trinity River levee area forced 328,000 gpm. from storage basins into the river. But the pumps could not handle the entire load; neither could many sanitary sewers, whose overflow was largely caused by heavy infiltration through loose joints in high areas. To prevent the sewage from backing into buildings, service lines were broken and manhole covers lifted.

Mississippi tops 1937 flood stages at Baton Rouge and New Orleans

Recent heavy rains cause high stages on Missouri and many Mississippi tributaries—Red River reaches record level

Early this week the lower Mississippi at Baton Rouge, La., had exceeded by 0.1 ft. the stage of 45.0 ft. reached in the 1937 flood and was within 2.7 ft. of the all-time high of 47.8 ft. established in 1927, as was predicted last week by engineers of the U. S. Weather Bureau (*ENR* April 12, vol. p. 535). Still higher water there is expected April 21 when a stage of 45.5 ft. may be reached, according to Weather Bureau calculations.

Farther downstream at Donaldsonville, La., the stage Monday was 34.7 ft. and a crest of 35.2 ft. is expected April 21. These levels compare with 34.5 ft. reached in 1937 and 37.2 ft. in 1927.

Spillway in full operation

The Bonnet Carré Spillway above New Orleans is now operating at its full capacity of 250,000 cfs., diverting that much water from the Mississippi to Lake Pontchartrain and thence to the Gulf, according to H. W. Richardson of the *Engineering News-Record* staff, who is now in the lower Mississippi valley. This discharge is holding the main river at New Orleans under the 20-ft. stage, which is designated as critical at that point. This level compares with 19.3 ft. reached in 1937 when the spillway also was in operation, and the maximum of 21.3 ft. set in 1922 before the spillway was built.

At present the discharge past Red River Landing, La., down the main river and into the Atchafalaya River through Old River is 2,111,000 cfs., close to the record. Although the Morganza Floodway is ready for operation it will not be opened unless the flow at Red River Landing increases beyond that now expected.

Upstream conditions

The Mississippi is above flood stage from the mouth of the Ohio to the Gulf, but the levees are holding and no trouble is expected along the main river. The cutoffs below Memphis are keeping the stage down just as they did in the comparable flood of 1937.

Trouble has developed along the St. Francis River in Missouri below Wappapello Dam due to lack of adequate levees. Landowners in that valley refused to cooperate in a levee program on the false assumption that the limited storage in the Wappapello reservoir would provide ample protection.

A new record stage of 45.1 ft. was reached April 16 on the Red River at Alexandria, La. The previous recorded high at that point was 43.6 ft. established in 1932. This crest is causing backwater and local-district levee damage between Shreveport and Alexandria. Much land has been inundated in that area, blocking highways and railroads but no structural damage or inundation of major cities has occurred except for loss of a large highway bridge at Moncla, La. Federal-project levees on the Red below Alexandria are expected to handle all water in sight.

More rain on tributaries

Exceptionally heavy rains continued over the weekend in northeastern Oklahoma, northern Arkansas, southern Missouri and eastern Kansas to produce severe overflows in all tributary streams in that area. Rainfall in excess of 13 in. was received in one storm in northeastern Oklahoma, and at Seminole, Okla., 12.1 in. occurred in 12 hours on April 14. As a result of continued heavy precipitation on the basin of the Arkansas River, this stream early this week was in flood from Wichita, Kan., to the mouth. Severe flooding below Tulsa is expected and at Little Rock, Ark., the stream may reach 29.0 ft. about April 20, which compares with the 30-ft. crest of the disastrous May, 1943, flood and a maximum record stage of 33 ft. established in 1927. Farther upstream at Ft. Smith, Ark., the flood Monday night crested at 38.4 ft. and Tuesday morning was falling. The record stage on this gage is 41.7 ft., established in May, 1943.

Severe flooding is also occurring on several tributaries of the Arkansas, including the Little Arkansas, Walnut, Cimarron, Verdigris, Lower Canadian, the Illinois, and Neosho rivers, according to the Weather Bureau. On the latter stream above Grand Lake, the maximum stage at Burlington, Kan., is expected to approach the 35.0-ft. crest of the April 1944 flood, which established new records at several points. The Verdigris was expected to reach 48.0 ft. at Independence, Kan., April 17 or 18. This reading would be a new record, as the previous maximum recorded stage was 47.6 ft. established in 1943.

Further floods predicted

Extensive flooding on other streams is also predicted by the Weather Bureau. The White River is rising to seriously high stages and near-record stages were reported Monday in the upper portion from Beaver, Ark., to Ozark Beach, Mo. These rising stages are expected to proceed downstream with crests exceeding the high stages recorded earlier this month.

North bank levees on the Arkansas below Pine Bluff, not built as a federal project, are critical right now, with higher water in sight. The St. Louis-Southwestern R.R. bridge at Pine Bluff is threatened.

Monroe, La., is safe behind its ring levee as the flood crest passed by on the Ouachita River.

The Missouri River will rise to stages one to two feet above flood stage from Kansas City to the mouth. The Osage River is in severe flood in the upper portion with moderate overflows indicated to the mouth. Light to moderate flooding is indicated in tributaries of the Kansas River and other tributary streams in northern Missouri and in Iowa.

Fortunately, the flood crests in the lower Mississippi valley are outside of the rain area and will not be affected by the new floods on the tributaries upstream. However, the high water on the lower Mississippi River will be prolonged.

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Arkansas River compact favored by Senate

The bill (H.R. 914) granting the consent of Congress to the states of Colorado and Kansas to negotiate and enter into a compact for the division of the waters of the Arkansas River, was passed by the Senate April 9.

The House Committee in approving the bill said, "In that part of our country lying west of the ninety-seventh meridian controversies frequently arise between two or more states over the most beneficial use of the waters of the rivers which cross or form the state boundary lines. The experience of those states throughout the semiarid west where such controversies have arisen has shown that it is most desirable for the states involved in the controversies to get together in a compact whereby agreement is reached concerning the uses of the water. The constitution of the United States requires the consent of Congress for all such compacts and agreements between states. Congress has heretofore given its consent in several cases similar to the one covered by H. R. 914. The language of the bill is in the customary form, and therefore the Committee on Irrigation and Reclamation reports the bill unanimously.

This bill is substantially identical with the Senate Bill S. 187.

President Truman favors creation of an MVA

President Harry S. Truman is in favor of the creation of a Missouri Valley Authority, according to a statement made Tuesday in his first press conference after becoming President. He has taken a similar position in the past. A few weeks ago he made known that he would like to have the authority headed by Brig. Gen. Lewis A. Pick of the Army Engineers, originator of the Pick plan for the Missouri River and more recently in charge of construction of the Ledo Road.

In February of this year when Senator Murray introduced his bill (S. 555) calling for creation of an MVA, Mr. Truman, as Vice President, referred the proposal to the Senate Commerce Committee. Proponents of the bill claimed that this was hostile action, but Mr. Truman said he was following a regular parliamentary procedure, although similar bills a few years ago were referred to another committee. The Commerce Committee on Monday began hearings on the bill, which calls for the establishment of a corporation headed by three directors appointed by the President to serve 9-yr. terms at $15,000 yearly.

Different than TVA

When questioned about the method chosen to deal with the bill, Mr. Truman reiterated that he was in favor of a Missouri Valley Authority. However, at that time he stated that he wanted something different from the TVA, which he considers as placing too much emphasis on power development. His preference at that time was for flood control, irrigation and soil utilization to get major attention, with navigation and power production taking suplemental positions.

Recently the states of Montana, Iowa and South Dakota have gone on record officially against establisment of an authority, and the Nebraska and Kansas legislatures have revealed they see need for overall control in river basins but are not necessarily in favor of the type of authority Senator Murray proposes. The St. Louis Chamber of Commerce, which could be expected to be against the proposal, convassed its members and found 776 favoring establishment of an authority and 700 against. Following this survey, the chamber has gone on record in favor of the proposal.

So far as is known, the President has not expressed his views in regard to the joint plan of the Corps of Engineers and the Bureau of Reclamation. (See *ENR* Dec. 14, 1944, vol. p. 757 for details of this compromise program, presented to the Congress last year.)

Dallas gets low rate on its master plan bonds

Public improvement bonds worth $1,540,000 were recently sold by Dallas, Tex., to a New York syndicate, headed by Glore, Forgan & Co., at the lowest interest rate in the city's history—.926 percent for 1 percent, twenty-year serial bonds and .885 percent on another issue.

Much of the money from this bond sale will be used to prepare preliminary plans for the city's master plan projects, and for surveying and buying rights-of-way for streets, and for building sites so that work on the projects can begin promptly after the war.

Early this month the master plan received a slight setback when the suburban communities of Highland Park and University Park voted not to consolidate with Dallas. However, Preston Hollow, a third surburban community, voted favorably.

Dallas officials wanted all of these communities to come in because it was thought that the master plan could be thoroughly effective only with consolidation.

Dallas voted approval of ten charter amendments dealing with consolidation, and to annex adjacent unincorporated territory upon the recommendation of the city council, with or without the property owners' consent. It voted also to extend its zoning power three miles beyond the city limits. These last two measures were needed to carry out the master plan idea, including the straightening of the boundary line in sections of the city, and to prevent the city's growth being further interfered with by surburban municipalities.

Mayor J. Woodall Rogers says that the city will proceed with its program, trimming it as much as necessary to serve the areas affected.

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Australia completes huge graving dock

A concrete graving dock has been completed at Sydney by the Australian government at a cost of £9,000,000. It is 1,116 ft. long, 154 ft. wide and 45 ft. deep, comparable to fixed drydocks built by the U. S. Navy at Philadelphia, Brooklyn, San Francisco and Hawaii. The drydock at Sydney required four years to build.

Characterized as the greatest engineering job in Australian history, construction of the dock was especially significant as Australia has no capital ships. However, the British Pacific Fleet is based on Australia and the drydock is necessary for its maintenance.

Organization to fight St. Lawrence Seaway

Creation of the New York State Conference in Opposition to the St. Lawrence Seaway Project, a statewide organization to oppose actively the St. Lawrence River development plan of the United States and Canada, has been announced at Buffalo, N. Y.

Richard H. Templeton, general counsel for the organization, says that "the organization is convinced that such a water route would strangle the commercial, industrial and economic life of the state," and it will fight all attempts by proponents to obtain Congressional approval.

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Tacoma taking steps to better sewer system

Initial legal steps towards construction of extensive improvements to the Tacoma, Wash., sewer system were taken recently when Works Commissioner A. R. Bergersen asked the city council for authority to issue and sell $3,000,000 in bonds voted last fall.

The sewer project involves construction of a trunk line, five tributary mains and a sewage treatment plant in the southern section of the city. In the northern section all outfalls will be extended to deep water. Bids for construction work were scheduled to be opened at an early date.

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Committee of 10 states opposes an "MVA"

Opposition to a river authority was voiced by the Missouri River States Committee at Omaha, Neb., on April 5. This committee, representing the ten states of the Missouri River watershed, has a membership of ten governors and two appointed committeemen from each state.

While expressing appreciation to the President, Congress and the administrative agencies for what has been accomplished in the development of the river basin, the committee went on record as not approving the "authority" measures which have been introduced in Congress.

The basis of this opposition was unwillingness to have granted to any agency "unchecked authority to engage in private business, operate farms, remove hundreds of thousands of acres of land from the tax rolls, take over the administration of education and of local and state laws, and do the economic planning for the entire area."

Simplified practice is proposed for clay pipe

A simplified practice program now being organized by the clay pipe industry proposes a reduction in the number of items to be manufactured from 1,500 or 1,600 down to 519, according to H. C. Maurer, president of National Clay Pipe Manufacturers, Inc. The new program, more lenient than WPB limitation order L-316, is scheduled to go into effect upon the expiration of that order.

The current program was voluntarily set in motion by members of the clay pipe industry to retain in postwar years the advantage of present simplified practice. A Clay Pipe Industry Simplification Committee was appointed at a meeting of industry representatives and a member of the Simplified Practice Division of the Department of Commerce in June, 1944. W. E. Robinson, president of the Robinson Clay Product Co., Akron, Ohio, was appointed chairman.

Covering different practices in the eastern and western parts of the country, the proposed program is composed of two schedules, A and B, on account of the different established practices in the two sections.

A basic change is the adoption of extra strength clay pipe with external diameter the same as that of standard strength pipe.

Standard strength and extra-strength pipe will be manufactured in the following sizes: 4, 6, 8, 10, 12, 15, 18, 21, 24, 27, 30, 33 and 36 in. In California, below the 36th parallel, extra-strength reinforced concrete or clay collars will be made in 39 and 42 in. sizes. A small supply of obsolete sizes will be available for repair and maintenance.

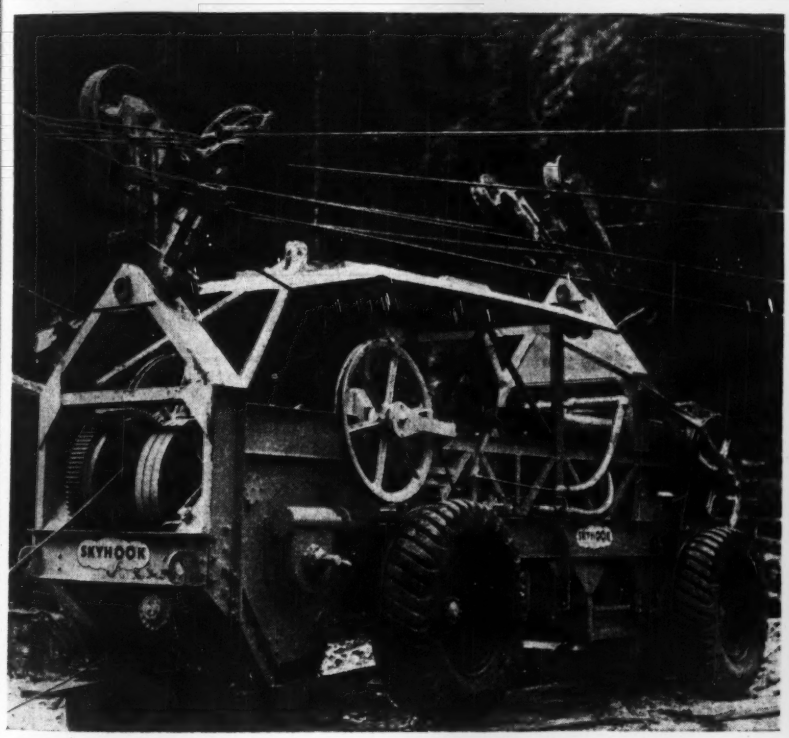
A copy of the proposed clay pipe simplified practice program may be obtained by writing to the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C.

British Columbia roads are to be improved

Construction of highways from the American border to British Columbia cities is now receiving special consideration from the provincial government, according to Herbert Anscombe, minister of public works.

He revealed that between Vancouver and the British Columbia-Alberta border, there are 10 entrances by highway between Canada and the United States. He said that at each of these points the American roads to the Canadian border were in excellent conditions, but that this was not the case in the majority of instances on the Canadian side.

Mr. Anscombe said the government plans to modernize the Canadian highways to the border, so that they may become equal to those on the United States side.



"Skyhook" becomes an actuality for many construction uses

Construction men have long heard of "skyhooks" for handling loads at high elevations or in inaccessible areas. Here, finally, is a skyhook developed for logging, which can be operated over a length of 5,000 ft. with intermediate supports as required.

Track cables of 2-in. dia. are suspended from guyed trees or towers and the vehicle is propelled in either direction by means of two ¾-in. cables that are anchored at both ends of the cableway and passed through a system of power-driven sheaves on the vehicle. Built into the vehicle are two power-driven, individually operated drums around which are wound ⅛-in. cables for lifting the load to be carried by the vehicle.

The machine can be moved from one location to another on the ground under its own power by mounting tires on the sheaves that are used to propel the machine along the cableways. Steering is accomplished by means of brakes on either side of the machine, much like a crawler type tractor.

Actual application of the skyhook, to date, has been in logging but its inventor, Phil Gravinski, and the manufacturer, Pointer-Willamette Co., of Portland, Ore., say uses planned for it include earth moving, dam and bridge building as well as ship loading and unloading.

Louisville's filtration to be greatly expanded

Bids submitted to the Louisville, Ky., Water Co., April 3 indicate that the company will spend around $880,000 to expand filtration facilities and water treating capacity. This will mean construction of large additions to its water treating and reservoir plant. Of the seven bidders, with bids ranging from $660,000 to $890,000, the S. N. Nielsen Co., Chicago, was low. Time limit for completion of the job is set at Nov. 1, with a $50 a day penalty thereafter.

In the improvement plan the company has included a 60-in. main from the pumping station to the filter plant to replace multiple smaller mains now in use. The cost of this main, not included in the bids opened, is estimated to be about $300,000. The cost of the entire program will be met by reserves set aside from earnings.

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Indiana has a division of water resources

A division of water resources and topographical mapping has been created in the Indiana Department of Conservation. Charles H. Bechert of Indianapolis has been named head of the division, which was formed to meet the state's increasing need of water resources.

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States asked to choose interstate road routes

Each state highway department has been asked to proceed at once with a designation of routes for inclusion in the National System of Interstate Highways, it has been announced by Thomas H. MacDonald, Commissioner of Public Roads. The designation is to be made in accordance with the Federal-Aid Highway Act of 1944 which requires that: "There shall be designated within the Continental United States a national system of interstate highways not exceeding forty thousand miles in total extent so located as to connect by routes as direct as practicable, the principal metropolitan areas, cities, and industrial centers, to serve the national defense and to connect at suitable border points with routes of continental importance in the Dominion of Canada and the Republic of Mexico."

In requesting early action on the tentative designation of a system, Commissioner MacDonald directed the attention of the state highway departments to the report entitled "Interregional Highways" published as House Document 379, 78th Congress, 2nd Session, and the National Interregional Highway way System recommended therein by the National Interregional Highway Committee with the concurrence of the Public Roads Administration. (*ENR* Jan. 27, 1944, vol. p. 144). He also directed attention to the recommendation concerning the advisability of a further designation of circumferential and distributing routes within and around the larger cities connected by the system. It was made clear that in presenting these recommendations for consideration the Public Roads Administration intends in no way to limit the freedom of action of the states in selecting routes for tentative designation.

In reaching a decision on the routes to be tentatively designated each state highway department is required by the law to act jointly with the highway departments of adjoining states.

The state highway departments are asked to submit to the Public Roads Administration by July 1, maps showing the routes tentatively designated, accompanied by data indicative of the merits of these routes.

On the basis of these proposals a system conforming to the 40-000-mile limitation will be designated by subsequent agreement of the states and the Public Roads Administration, and submitted for approval by the Federal Works Administration.

Hassinger to head WPB construction machinery

Lieut. Col. John H. Hassinger, Corps of Engineers, has been appointed director of the Construction Machinery Division of the War Production Board to succeed Henry M. Hale, resigned. He has been connected with war production ever since the organization of OPM, which he joined as an industrial specialist. In April, 1942, Hassinger was commissioned as a major in the Engineer Corps, and has served as chief of the construction machinery branch, military supply, Office of Chief of Engineers. In this position he has worked closely with his predecessor in the construction machinery division, WPB.

Henry Hale is remaining with WPB for a while, and will be available as a consultant. As soon as his services are no longer required by WPB he will devote full time to the newly-organized Milton-Hale Machinery Co., construction equipment distributors, with offices at Albany and Syracuse, N. Y.

Berkeley, Calif., has hired a planning consultant to assist in the preparation of a plan for the development of adequate off-street parking facilities adjacent to the commercial center of the city, and to develop a master street and highway plan.

JOBS OF THE WEEK

OIL REFINERY, Atzcapotzalco, Mexico.
Petroleos Mexicanos, Mexico City, Mexico, will improve oil refinery by its own forces. The estimated cost is $18,000,000.

TIRE FACTORY, Chattanooga, Tenn.
Clemmer Construction Co., Akron, Ohio, has been awarded a contract for building a tire factory by Mohawk Rubber Co., Akron. The estimated cost is $2,250,000. Robert & Co., Atlanta, Ga., are the engineers.

BUILDINGS, Camp Springs, Md.
U. S. Engineers, Washington, D. C., awarded a contract for administration building, bachelor officers' quarters, and housing at Andrews Field to Harwood-Nebel Construction Co., Washington, D. C., at $4,500,000. Gannett, Fleming, Corddry & Carpenter, Inc., Harrisburg, Pa., is the engineer.

IMPROVING HIGHWAYS, Mexico.
Department Public Works, Mexico City, will construct by its own forces improvements on Pan-American Highway through Mexico. The estimated cost is $8,000,000.

POWER PLANT, Brave, Pa.
Peoples Natural Gas Co., Pittsburgh, Pa., awarded a contract to build a power plant at compressing station to J. M. Baldwin, and Dravo Corp., both of Pittsburgh. The estimated cost is $1,000,000.

HOTEL, Toronto, Ont.
C. W. James Construction Co., Ltd., Toronto, Ont., has been awarded a contract to construct a 12-story, hotel, for Carlton Hotel Ltd., Toronto, Ont. The estimated cost is $3,250,000. Thomas Frame, Toronto, is the engineer.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 153.

OBITUARY

John J. Austin, 64, Akron, Ohio, engineer, died there April 8. Formerly he was with the Ohio State Department of Highways and was with the Akron division of streets for two years.

Leonardo Suzio, 78, Meriden, Conn., long associated with the construction industry in Connecticut, died March 16. He was president of York Hill Trap Rock Co., Suzio Trap Rock Quarry Co., and the L. Suzio Construction Co., road-builders.

John Harrison Spackman, 72, who surveyed the boundaries of Yellowstone National Park before the turn of the century, died April 5 at Rutledge, Pa. He was a graduate of Lafayette College and the University of Pennsylvania.

O. B. G. Fullaway, assistant secretary and assistant treasurer of the Fairmount Park Commission, died April 9 in Philadelphia, Pa. Prior to being appointed to the Park Commission post, he had been superintendent of the Philadelphia Department of Public Works for 16 years.

George Adolph Heitmann, Sr., 46, division foreman of the street and bridge department of Houston, Tex., died March 31. Mr. Heitmann had been associated with the department for 25 years.

Henry Godshall, 70, supervisor of highways in Hatfield Township, Montgomery County, Pa., for 20 years died April 5 at Hatfield.

John Halstead McLure, 78, engineer for the city of Chester, S. C., for 25 years, died April 6. He was a graduate of the University of South Carolina with degree of civil engineer in 1887. He was a former president of the South Carolina Water Works Association.

Chief Warrant Officer Tom Y. McKinney, former contractor and builder of San Angelo, Tex. was killed on Iwo Jima while serving in the Engineer Corps.

Reuben A. Green, 56, a laboratory technician for the U. S. Engineers, died at Memphis, Tenn., April 11.

John G. Schmidt, 60, city engineer of Norwood, Ohio, and former engineer of Logansport, Ind., died April 11.

Army Engineers and RFC obtaining storage space

To accomodate government-owned equipment after "V-E" day, 12,400,000 sq. ft. of storage space is being built or cleared by the Corps of Engineers and the Reconstruction Finance Corporation under a contract negotiated between the RFC and the Army Service Forces. The Army Engineers are now procuring prefabricated steel for single-story warehouses to be built by the RFC and to furnish 4,400,000 sq. ft. of space, and they are practically finished with a group of temporary timber-frame warehouses to provide 1,500,000 sq. ft. In addition, they are preparing about 6,500,000 sq. ft. of open storage.

Eventual cost of the buildings, amounting to about $7,000,000 will be borne by the RFC, which has agreed to reimburse the ASF for the cost of the program. They will be used under the management of the Surplus Property Custodian to store government-owned machine tools and other war plant equipment which must be removed to make space for reconversion by the companies involved.

The prefabricated steel warehouses will measure 20 by 100 ft. Eighty percent will have sidewalls 10 ft. high and the remaining 20 percent 12-ft. walls. Present plans call for the location of buildings at such main centers as New York, Boston, Chicago, Cincinnati and Detroit. Plans for other cities and possibly for the west coast will be announced later.

YOU CAN HELP SAVE PAPER FOR WAR

Paper is a Number I war material shortage—because over 700,000 different *war* items are wrapped, packaged, labelled, tagged, or made from paper or container board. The Pacific war, when it speeds up, will require stupendous amounts of paper and board since double and triple packing are required for protection against weather, insects, etc.

So please—

1. Share this magazine with your associates. Because of the paper shortage, the number of copies is limited.
2. Organize for a continuous drive in your office and plant to collect waste paper of any kind to put into paper salvage. Clean out old files, dead correspondence, obsolete records, useless display materials, cartons, etc.

Aid the war effort—speed victory—DO THIS EXTRA BIT TO HELP.

Legion of Merit awarded Col. A. C. Welling

Col. Alvin C. Welling, U. S. Corps of Engineers, was awarded the Army Legion of Merit on Jan. 19 for his outstanding work in connection with building the Alcan Highway. He was with the 35th Engineers on their famous 350-mile overland trek from Dawson Creek to Ft. Nelson, B.C., in March, 1942, and later became executive officer to the commanding general, south sector of the highway.

For some time Col. Welling has been in the India-Burma theater, and was recently appointed chief engineer of that theater, replacing Brig. Gen. James A. O'Connor, formerly chief of the Northwest Service Command in charge of the Alcan Highway. Col. Welling has also been named Chief Engineer, Services of Supply and Commanding Officer, Construction Service, for the India-Burma theater.

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Engineer promotions on Southern Pacific Lines

R. W. Barnes, chief engineer of the Southern Pacific Lines in Texas and Louisiana, with headquarters at Houston, Tex., has been made vice-president, succeeding E. A. Craft, executive vice-president. A civil engineering graduate of the University of Colorado, Mr. Barnes became associated with the Southern Pacific Lines in 1912. He has served successively as draftsman and assistant engineer, construction engineer, and chief engineer at Houston.

H. J. McKenzie, former assistant chief engineer, succeeds Mr. Barnes as chief engineer. Mr. McKenzie, a Texas A. and M. College graduate in engineering and architecture, has been with the Southern Pacific since 1926 and has been assistant chief engineer since 1943.

L. A. Loggins, former division engineer of the Houston division of Southern Pacific, succeeds Mr. McKenzie as assistant chief engineer Mr. Loggins holds a B. S. degree in civil engineering from the University of Texas. Joining the Southern Pacific in 1920, he has served successively in different engineering capacities at Ennis and Austin, Tex.; as division engineer at Victoria, Tex.; and as division engineer at Houston since F b. 1 of this year.

The Week In Engineering and Construction
Continued on page 100

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Structural Design Practice

Sir: Mr. Boase's excellent article "South American Building is Challenging" (*ENR* Oct. 19, 1944, vol. p. 499), provoked similar questions in the writer's mind as are discussed in Mr. Kalinka's comments. Mr. Kalinka's statement that "we have been slack in supporting the progress of modern design principles and procedures" is borne out not only by comparison with South American building, but also with modern structures in technically advanced European countries. Significant contributions to the development of structural design have been made in this country in the recent past, such as Hardy Cross' method of moment distribution and the modern theory of the suspension bridge. However, most other recent advances, such as reinforced concrete shell and membrane structures came to us from Europe, as they did to South America, and the general state of the art of design is rather far below the level of its most advanced representatives. Mr. Kalinka's four proposals to improve the situation are very pertinent, but they do not seem to cover the whole question.

One of the main reasons for the structural advances in Europe, as in South America, is the client-contractor relation pointed out in Mr. Boase's article, which is entirely different from that customary in this country. During eight years of structural work in various countries of the Eastern hemisphere the writer had occasion to observe the working of this client-contractor arrangement and he is convinced that it is this arrangement which is chiefly responsible for the advanced status of structural design in those countries. The fundamental difference consists in the fact that competitive bidding includes the design phase, rather than to be limited to erection, as in this country. Thus, for example, in asking for bids for a bridge, the data furnished by the prospective owner will be limited to topographical, geological and hydraulical information, loads to be carried, clearances, requirements of river traffic, and similar general conditions. The bidders, firms which might be called "designers and builders" rather than contractors in the customary sense, maintain their own design bureaus. Their bids include complete, independent designs of the entire structures, in addition to cost and organization of erection. For any particular project of sizeable proportions up to a dozen or more bids may be submitted entirely different in design. Part of them may be done in reinforced concrete, part in steel. By this method the ingenuity of the designer is used to the limit in bringing down the cost of the structure. Great stress is laid by the firms on maintaining first-rate design staffs because without them they would have no chance whatsoever of submitting a low bid.

The independent consulting engineer plays a significant part in this setup. He is usually called upon by the prospective owner to examine the submitted designs and pass upon their safety and suitability. After the bid has ben awarded, he may be retained by the owner to cooperate with the executing firm in possible further improvements. Also, for unusually involved projects prospective bidders frequently feel that their own design staffs are inadequate for the task and call upon consulting engineers for help on the design. In contrast to this setup which stimulates the designer to his best efforts, competition in the design phase of a project is almost completely absent in this country. It appears logical that for this reason savings which might be achieved by the use of advanced design methods are frequently not realized.

Another somewhat lesser factor which seems to hamper the development of modern structural design is the state of structural publishing in this country. Book publications are almost completely limited to elementary undergraduate textbooks, obviously for commercial reasons. Very few books of the more advanced monograph type are published, such as they abound in Europe, of the kind, say, of Bleich's two volume book on steel structures, the more than a dozen volumes of the German handbook of reinforced concrete, to mention only a few. A step in this direction has been made by the initiation of endowed engineering publications, but the scope of this undertaking is still much too small to keep pace with the developments in the field. With regard to periodical publications, the *Proceedings* of the Am. Soc. C. E., practically the only available journal for structural papers, plays an outstanding role in publishing original research in the field. It is supplemented by the many university publications which also serve the research field, but have the disadvantage of reaching a rather limited audience. The practical designer, however, is not only interested in original research. He depends on design aids, such as tables of moment coefficients and similar data, graphs and diagrams of influence lines and the like, the development of which does not necessarily involve fundamental research, detailed information on the design phase of structures erected or in the process of erection, advance discussions on structural problems of important public works projects and the like.

In many countries specialized journals of a scope smaller than the *Proceedings* serve exactly this purpose, some of the weeklies or biweeklies. The English *Structural Engineering*, the German *Beton und Eisen* and *Stahlbau*, the Russian *Project and Standard* are of this type. In all these countries, in addition to periodicals of this sort, more substantial journals are available for publication of extensive fundamental research such as is now handled in the *Proceedings*. In this manner the designer is enabled to build up on his necessarily limited college background and to keep pace with his field, in fundamental developments as well as in the more mechanical details of methods and procedures.

It might appear that a rather high price would have to be paid for the achievement of a more advanced state of design practice. First-rate design staffs can only be maintained at considerable cost to the firms. Increased

salaries of city engineers and similar officials, a very important point made in Mr. Kalinka's comments, will have to be borne by the taxpayer. More extensive publishing service most likely would have to be subsidized either by professional societies or by trade organizations, as is done in some countries. Experience in Europe and South America seems to indicate that these increased outlays are greatly outweighed by the savings in over-all building costs which can be achieved by modern design methods.

GEORGE WINTER
Asst. Professor in Civil Engineering
Cornell University
Ithaca, N. Y.

Mosquito Control in British West Indies

Sir: I read with interest the article on mosquito control in Panama by A. N. Carter (*ENR* Nov. 2, 1944, vol. p. 560). In the island of Grenada, B.W.I., a similar project has been in steady progress for the past two years, under the control of the Public Health Department with the writer as the resident construction engineer.

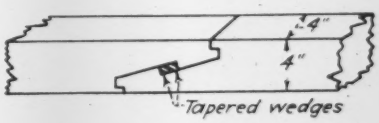
Results have been good, each job being somewhat dissimilar according to prevailing conditions. The accompanying photographs illustrate sections of the pre-cast, low-velocity drains discharging into coastal lagoons through self-cleansing, sea-head culverts that prevents sand cordons from being formed by maritime action.

CLARENCE RENWICK
Superintendent of Public Works
St. George's, Grenada, B.W.I.

Did Japs Copy Chinese Design?

Sir: The drawing and description of the timber joint made by the Japanese on Majuro Island, published in *ENR* Dec. 14, 1944, vol. p. 774, reminds me of what I saw in the Philippines where I lived as a youngster for about nine years.

During that time I saw literally thousands of nearly identical joints hand cut and fitted by Chinese carpenters. These joints were used in columns and beams constructed of hardwood in almost all of the old buildings in the islands. The only difference between these and the one shown in your drawing is that the Chinese joints are tightened by tapered wedges driven from opposite sides at the center of the diagonal cut.

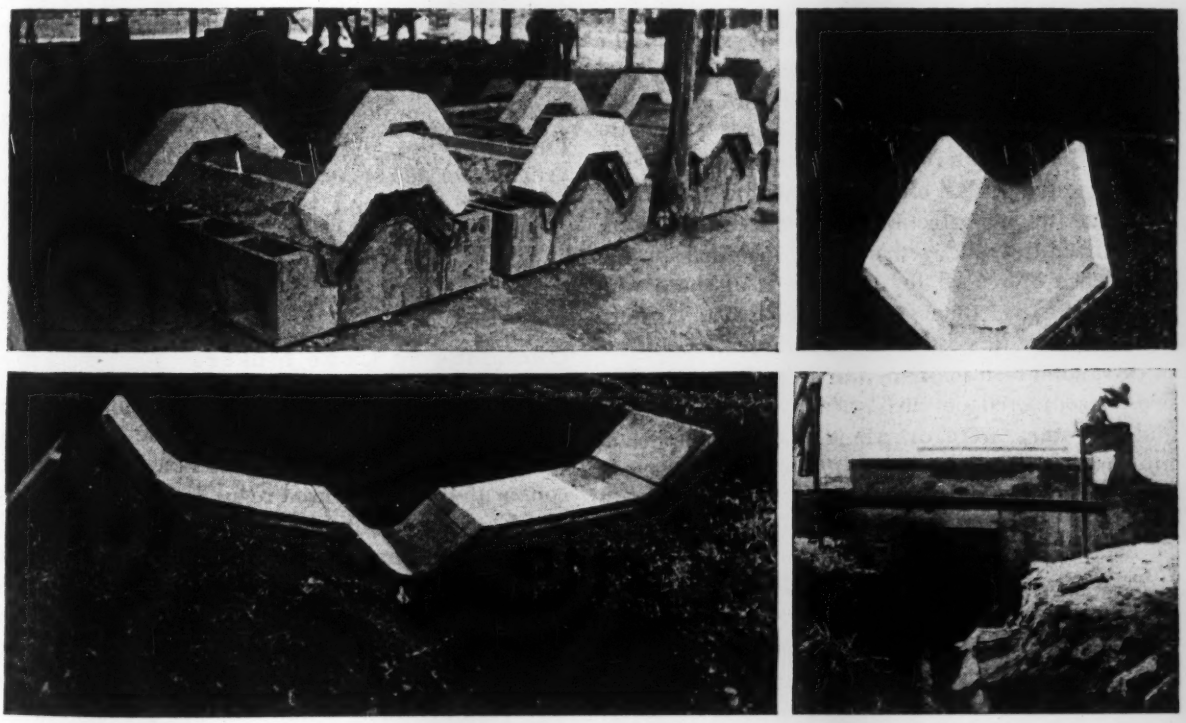


Sketch of wedged timber joint of Chinese origin designed to take either tension or compression.

It would seem to me that this makes a somewhat better joint than the one you describe.

The Japs have borrowed the greater part of their arts from other peoples, largely from the Chinese. I am inclined to believe that the Chinese originated this joint and the Jap copied it.

N. F. NEWMAN
San Francisco, Calif.



Upper left: Inverted sections for concrete lining for malaria-control drainage ditches in St. George's, Grenada, are cast upside in timber forms. Concrete yokes on forms serve both as braces and weights to hold upper forms in place. Upper right: A typical invert tile; this section when flowing full provides a cross sectional area of 0.446 sq. ft. and a mean hydraulic radius of 0.250 ft. Lower left: Invert and side slabs in place for the first section of a drain providing a cross sectional area of 7.734 sq. ft. and a mean hydraulic radius of 0.828 ft. Lower right: Entrance to a self-cleansing, sea-head culvert. Side slopes of approach ditch are yet to be shaped and paved.

EDITORIALS

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April 19, 1945

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Experience of Record

CORAL AIRSTRIP SURFACING as laid by our forces on islands of the Pacific has been a great success. Our development of methods for using it speedily and effectively has contributed greatly to our rapid advances in pushing back the Japs. Naturally enough, ideal materials and conditions are not always found. Like other construction materials, coral has its imperfections, hence it is important that difficulties and setbacks be included in the experience of record for the benefit of those who start where the pioneers leave off. The airfield designated in this issue as "Bomber Three" (see p. 88), combined many of the difficulties that Seabees encountered on such jobs. What these were and how they were overcome may be important information in postwar extension of island bases.

Back of the Headlines

LATE LAST YEAR, some of the civilian engineers in government offices in Washington who are authorities on river hydraulics cleared their desks and left on what was characterized as a special mission. Now that the Roer and Rhine have been safely crossed, their mission has come to light. They had gone to France, armed with nothing more formidable than data about the hydraulic characteristics of the rivers of western Germany, to determine for our combat troops the magnitude of natural and artificial floods that might occur in those rivers and the probable timing of the natural floods. Much of their task was monotonous, but it was not without excitement, such as receipt of a captured copy of a German plan for using the Rhine reservoirs and dams to create artificial floods. What these men accomplished, coming to light as it does at a time when attention is focused on the rapid advance of the Allied armies, serves to emphasize the little recognized fact that the spectacular events which now fill the newspaper headlines were only made possible by many similar operations behind the lines, all carefully planned and closely coordinated.

Unrealistic Flood Planning

HEARTENING to all who have been concerned over the current trend of the Army Engineers to endorse almost any flood-control project—regardless of how nebulous its justification might be—was the recent revolt of people in the valleys that were to be flooded by a proposed project for the Potomac River basin (*ENR* April 12, vol. p. 545). Dwellers in the historic Shenandoah valley and from the valleys of other Potomac tributaries marched on Washington to protest the flooding of their fertile fields by dams designed to reduce floods in the lower river by a few feet. As a result, the plan to spend nearly $236,000,000 on 14 dams is to be abandoned or materially modified. Revolts like this one in the Potomac valley and that of farmers in Vermont a year or two ago serve as a valuable check on planning that gives too much weight to theoretical savings and too little to the very real though less tangible values that must be wiped out to make those savings.

Challenge to Code Makers

IN A STUDY of reinforced concrete design practice in South America, Arthur J. Boase finds much enlightenment in comparing the Brazilian building code with the widely used regulations of the American Concrete Institute. In a statement published elsewhere in this issue, he sees considerable merit in what the Brazilians are doing and raises some questions for North American engineers to ponder.

Brazilian engineers, whose code concepts reflect a liberalized version of European practice, have increased permissible unit stresses, are less restrictive in their stipulations and have shown courage in adopting new ideas where reasoning indicated them to be sound. The safety and practicability of the Brazilian code has been proven by theoretical analysis, laboratory experiments and actual application

of its provisions to structures over a long period.

A review of Mr. Boase's findings makes it clear that we can learn much from our neighbors south of the border that might be usefully applied in post-war design practice. We may find it impractical, however, to go as far in some directions as the Brazilians have gone due to the different conditions under which we work. Nevertheless, their many practical demonstrations of what can be done by a more rational application of our present knowledge of the properties of concrete than is now permitted in most of our building codes stands as a challenge to our code-making agencies.

Stabilization of Construction

BEARDSLEY RUML'S ANALYSIS of the construction industry's problems (see p. 94) brings an objective viewpoint to a situation that deserves wide discussion. None will disagree with his thesis that stabilization of the industry will help it to prosper, thus making it a more effective part of the national economy, but many will disagree with his conclusions that the construction industry is a wasteful one and that a Congressional inquiry will reveal practices that may call for regulation of the industry.

In saying that we do not intend to imply that a thoroughgoing Congressional investigation would not turn the spotlight on practices within the industry that are a check on its efficiency, for it would; and the effect might be very salutary. What we mean is that few if any of these practices are such as to call for regulation of the industry by some federal regulatory body like the Interstate Commerce Commission. A Congressional inquiry would call public attention to the fact that trade unions will not permit factory-bent reinforcing bars to be brought into New York City and that ready-mixed concrete cannot be used in Chicago, also that a brick mason is only allowed to lay a certain number of bricks in a day, regardless of how easy the laying may be. Only an optimist, however, would conclude that Congress would undertake to eliminate these restrictions by means of a regulatory body. Elimination of those practices, if it is to come, must come from within the industry, from enlightened trade unions. True, a Congressional inquiry might speed that enlightenment.

A Congressional inquiry also might serve to answer the frequently made but never proved charge that prices of basic construction materials like cement, stone, sand, steel and lumber are kept at artificially high levels by collusion among the producers. Control of prices of construction materials would appear to be the only field in which federal regulation may be justified, for, as Mr. Ruml points out, if violation of anti-trust laws is necessary to produce a desirable stability, Congressional action would be necessary to authorize that.

Mr. Ruml says that architects, contractors, building supply companies, labor, finance and mortgage companies all find it necessary to hold a price structure high enough so that the days of activity will pay for the time when there is little or nothing to do. In so saying he implies that contractors would bid lower if they were assured of continuous or nearly continuous work, that the suppliers of equipment and basic materials like lumber, steel and cement would lower their prices if their production curve could be leveled out, and that labor, if assured of fairly regular work, would lower the present hourly rates. Mr. Ruml's premise may be correct, but we believe that most of our readers will join us in expressing skepticism as to his conclusion that by equalizing the rate at which construction work is let to contract we can materially reduce construction costs. When work is plentiful, contractors do not figure their bids as closely as when work is hard to get and construction trades do not take work below the established wage rates.

Antiquated and needlessly restrictive building codes are a major cause of higher building costs. Congress could do little about them. Their faults must be corrected by concerted and aggressive action originating within the construction industry itself. Here again, the only contribution that a Congressional inquiry could make would be to point to the defects of existing building codes.

Mr. Ruml makes a strong argument in favor of studying the construction industry's problems. The problems are many and complex, hence no superficial study could produce worthwhile results. As Mr. Ruml recommends, the study would have to be made by a commission set up for that purpose with adequate powers to obtain all the data that would have to be compiled before specific recommendations could be made. Also, the commission would need the wholehearted support of the construction industry.

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"Adsec"—Facility Builder Working for the Front-Line Soldier

Waldo G. Bowman
Editor, Engineering News-Record
(By air-mail from the European Theater of Operations)

***Contents in Brief**—Operating in the Communications Zone, its forward line coinciding with the rear of the Army Zone, the Advanced Section, better known as "Adsec", is the forward link in the supply chain and is the biggest and most versatile Engineer organization in the European Theater of Operations. Especially equipped to handle heavy construction, Adsec engineers have erected bridges for railroads and highways, maintained roads, constructed pipelines, built ports and rehabilitated wrecked railroads from the Channel to the front line, as Adsec advanced with the armies.*

THE STRANGE COMBINATION of letters in the title of this article is a household word in the European Theater of Operations. A variation, slightly more official, is ASCZ, which are the initials for Advanced Section, Communications Zone.

Born and organized in England before the invasion, to be the spearhead of the supply system on the continent, it has already been that and much more. Not only has it been the forward link in the supply chain, handing food, ammunition, clothing, medicine and the various instruments of war direct to the Army commanders, but it is also the biggest, most versatile and best known Engineer organization in the E.T.O. The activities of its Engineer branch must invariably comprise one of the most important chapters in any engineering history of the war.

In the U. S. military set-up of the first World War there was no counterpart of Adsec, nor any need for one. With trench warfare, supply activities could be tied down geographically and organizations arranged on a more or less permanent, area basis. When war is fluid, however, as this one is, there must be a unit in the supply service that can move along with the advancing armies, leaving consolidation of supply facilities in the rear to others. Well-balanced and complete, it must also take on some of the characteristics of a municipal fire department, ready to move at a moment's notice, and to work on the run and under emergency conditions at all times. That is the role that Adsec was designed to fill.

As in the last war, the overall supply function is the responsibility of a Service of Supply, which operates in an area known as the Communications Zone, extending from the ports of embarkation in the U.S. up to the Army Zone, whose rear boundary may be anywhere within 10 to 25 miles behind the front line. For reasons whose explanation is circuitous and of no importance here, the organization that operates in the Communication Zone is also known as Communications Zone or Com. Z.

To carry on the work in its vast area, Com Z. is divided into a number of base sections. Each of these has a geographical boundary, such as the United Kingdom, Normandy, Brittany, Seine, Oise or Burgundy. Although they may be enlarged or combined or cut down as the supply situation changes, these sections are relatively fixed in position. Not so the Advanced Section, even though at any given time it has geographical boundaries too. Its forward line always marks the division between Communications Zone and Army Zone. The difference between Adsec and the other base sections is that its boundaries constantly change and in an advance always move forward toward the enemy. As a matter of fact, before most of the above-named base sections were in existence their present territory was for a time the site of an advance section.

Characteristics of Adsec

Adsec engineers arrived in France on D+3 and were at work D+4 on the pipeline that was to be extended, piece by piece, to Paris and beyond to keep the armies supplied with gas and oil. Extension of the pipeline in jumps, as the armies moved forward, is symbolic of the manner in which Adsec engineers moved across France from the Normandy beaches to the approaches to the Rhine, always on the heels of the doughboys, and always with the primary purpose of serving them with ports, railroads, power lines, hospitals, supply depots, waterways, roads and the like.

Adsec has been the facility builder for the front-line soldier. Moreover, except for the engineers who man the assault boats and install the pontoon bridges, there are few engineers, even in combat battalions, who work as far forward or who are as exposed to enemy fire as often as some of the men in the Engineer general service regiments and the Engineer port con-

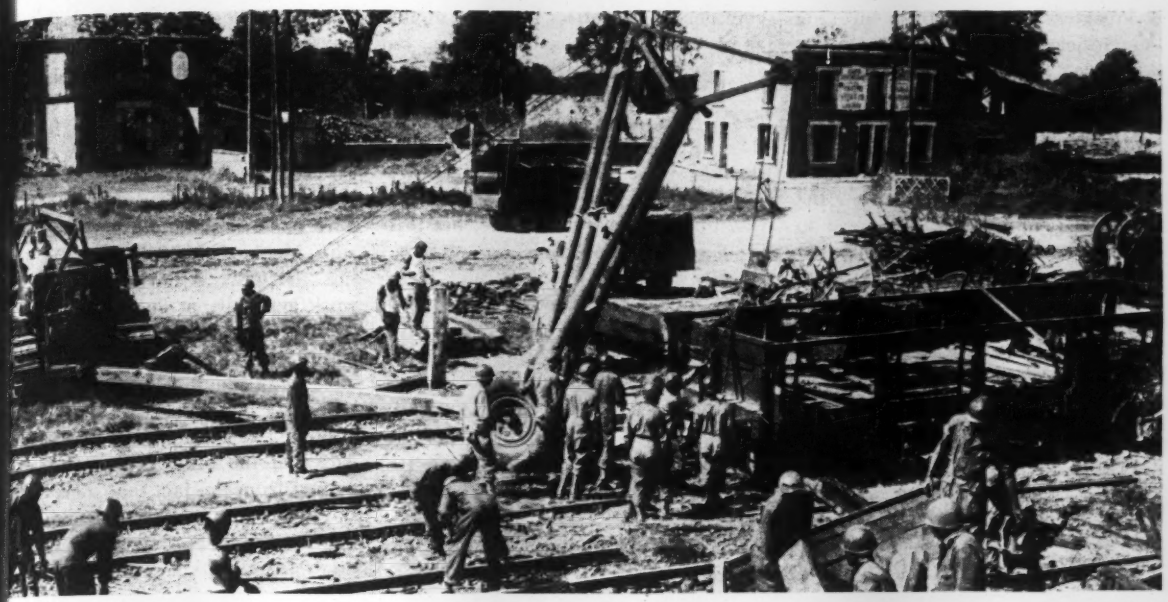


Fig. 1. Because Adsec gets there first, wrecked railroad yards always require its immediate attention.

truction and repair groups that are ttached to Adsec.

Because of the continual movement ecessary to keep up with the armies, dsec engineers have left monuments to their activities all across France nd Belgium and on into Germany. Nearly all of the railroad bridges fall in this class, and a good many highway bridges despite the fact that highways are the prime responsibility of the armies own engineers. Adsec has done a large amount of road work on three different occasions in Normandy, soon after we reached the German border and again just before the recent offensive when spring thaws created a dangerous emergency. Adsec not only maintained, but it operated the famous "Red Ball" supply route from Cherbourg to east of Paris, a monument in itself since it kept the armies moving until the railroads could be put into service.

Engineer outfits that follow along behind Adsec say that their only mission is to finish the jobs that Adsec starts, which is not as much of a joke as it is meant to be, since Adsec's primary mission is to get "something" ready quickly. If it is good enough for the remainder of the war, it continues to be used. If it is not, someone else has to enlarge or supplement it.

With such a situation, it follows that Adsec must be a designing as well as a constructing organization, supplementing the Office of the Chief Engineer of Com. Z. in those situations where advance planning is not possible. Adsec, for example, planned and designed the facilities for enlarging the port of Cherbourg far beyond the original plans when military developments made this necessary. More recently it played a big part in the designing of the Rhine River railroad crossings, which its construction forces will have to build. Between Cherbourg and the Rhine, Adsec has turned out a string of designs that fittingly connect its first big job of last summer and its incomparably greater one of this Spring.

Aids building material producers

Finally, to its designing and constructing activities Adsec has added construction material manufacturing in the sense that it is actively assisting French and Belgian industry to turn out structural steel, bolts, nuts, welding rod, sand and gravel, cement and even coal. Remarkable success has attended these efforts partly, perhaps, because of Adsec's experience in rounding up local construction supplies for every job it has undertaken in its advance across France. The principal difference is that the early activity was in the nature of scavenging to unearth German-accumulated stocks, while now these "secondhand" materials are being supplemented by new materials. In either case, it is part of Adsec engineering.

One other characteristic of Advance Section, Com. Z. should be emphasized. It does more work in the Army Zone ahead of its nominal forward boundary than anywhere else. At the time of the invasion, and for some time afterward, 100 percent of Adsec's work was in Army areas, naturally, because Com. Z. forward boundary was then in England. Actually, Adsec was attached to the First Army, and was only potentially a part of the Com. Z. continental set-up, which would be established when and if we took enough of France to make such a move possible.

During the fast movement of the Third Army across France, Adsec's work in the Army Zone dropped to about 50 percent of its total. This increased, however, under the slower tempo of Army advance during the past winter so that by the time the Rhine offensive began late in February, Adsec was doing about 85 percent of its construction work in front of its nominal forward boundary.

Another way to view Adsec's tendency toward mobility is to note the time its headquarters remained at any one place. First, they were at Grand Camp near the Normandy beaches for 10 days, then moved on to Catz, near Isigny, for 50 days. Next came a big jump to Le Mans for 18 days, followed by another to Etampes, south of Paris. Here Adsec remained for only 11 days, a plot some say to keep

headquarters personnel from enjoying a magnificant chateau that they had taken over from the Germans. The next move was to Reims for a period of about 50 days, until the end of October when present headquarters were set up in Belgium. Now, after four months, the armies are on the move again, and Adsec will have to be ready to move, too.

How it began

Adsec had its beginnings in UK (United Kingdom) back in January, 1944, when a handful of officers was instructed to begin planning for a continental operation in terms of the engineering and construction necessary to supply the troops. (Officially, Adsec dates from Feb. 13, 1944.) The group first worked on the so-called Rankin plan which envisioned a quick ending of the war, and the necessity of occupation forces and the construction that they would require, but this soon gave way to plans for an invasion by assault.

By March 25, Adsec had moved to Bristol to be near First Army headquarters, to which it was to be attached initially, and on April 1 troops began to be assigned to its command.

Fig. 2. The regiment that built the great gas and oil pipeline was a part of Adsec until Paris was reached, when it was transferred to a new set-up—the Military Pipeline Service. Engineer troops are shown above installing a pumping station in Normandy.

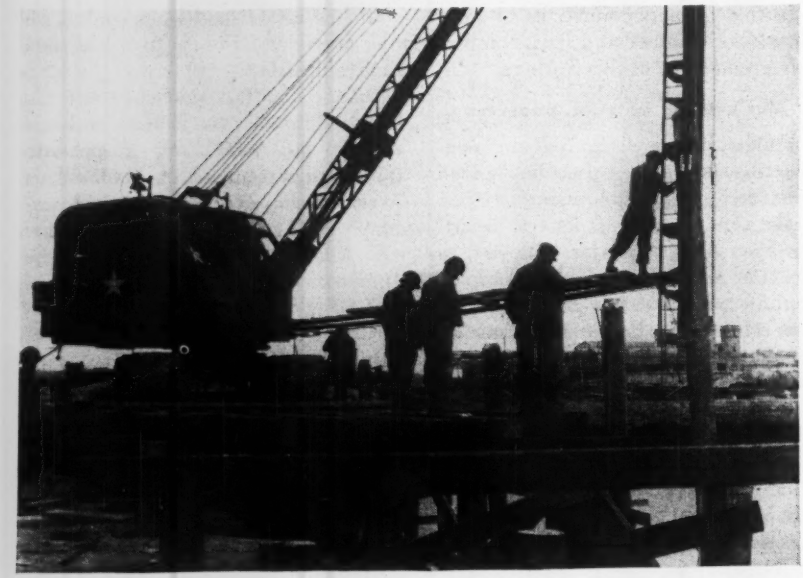


Fig. 3. Port construction was also Adsec's job for some time after the invasion. It built all of the small Normandy ports, planned the Cherbourg layout and did a substantial part of its construction.

None of these, however, became a physical part of the Adsec set-up until invasion time, instead being left with the base sections in UK for training. Except, however, for two battalions which went to a special railroad bridging school and for several general service regiments and port construction and repair groups who received training in pile driving, diving and harbor construction work generally at another school, the troops were not given specialized training. Since then, of course, they have acquired it to a degree that no schooling could ever provide.

Some idea of the magnitude of Adsec at the time of the invasion is gained from the fact that some 30,000 Engineer troops comprised the two dozen regiments that were attached to it. The initial job upon landing has already been mentioned—starting the POL (petrol, oil and lubricant) line—and right there was a forerunner of some of the things to come—lack of materials. But, whereas, for many types of work it was possible to live off the country for construction materials, the pipeline was something else again. The officers still recall as a nightmare the trips around the harbor at Omaha Beach in an amphibious "duck," stopping at every LST and Liberty freighter to ask if there were any pipe or pumps aboard.

The next job, in chronological order, involved development of minor ports necessary to supplement the beach operations until Cherbourg could be captured and rebuilt. Such facilities were located at Grand Camp les Bains, at Isigny, at St. Vaast la Hogue and at Barfleur, all on the west side of the Baie de la Seine. Soon, also, railroad work started, and after that the hospital program got under way. Highway repair and construction is a responsibility of the Army's combat engineers so that for the most part Adsec is relieved of this job, except to help out in emergencies, as it did in Normandy and again in Germany prior to the Rhine offensive.

Thus, during the first part of the invasion campaign, Adsec was really a part of the First and Third armies doing any work that was required in the way of heavy engineering and construction. It had no boundaries until Cherbourg was captured, after which a line was set up from there to Valognes and over to the beaches. The Army by that time had moved out

head. About July 18, Cherbourg was turned over to a new organization, which soon became the Normandy Base Section, and Adsec moved on in the first of many such moves to come. The pattern was laid.

Adsec's organization of construction forces is always changing, too. Of the regiments with which it started, it has dropped off perhaps two-thirds, also, however, picking up some entirely new ones now and then. Those dropped off were probably on some important job when orders came for Adsec to move, and it was decided to leave them behind to finish it. They then became attached to a fixed base section and may never have caught up with Adsec again. Others, on the other hand, have had this happen to them two or three times, and following each have always rejoined Adsec. The regiments that have always been under Adsecs control are the ones on railroad bridging. The special pipeline regiment was attached to Adsec up to the Seine, but since that time it has operated under the Military Pipeline Service of Com. Z.

The men who run it

Although Adsec is much more than an Engineer outfit, containing also the Quartermaster, Medical, Transportation, Ordnance and all other service functions of the Army, it is headed by an Engineer officer, Brig. Gen. E. W. Plank, well known to American construction men from his prewar assignments at Fort Peck Dam and in the airport construction section of the Office of the Chief of Engineers. In England he commanded the Eastern Base Section where the bulk of our large bomber base construction program was concentrated.

General Plank organized Adsec, and it is he who has brought it to its present high state of effectiveness. Yet, he has been the first to point out that a great bulk of the credit should go to the chief of his Engineer service, Col. E. W. Itschner, who also has held his present position since the advent of the Adsec idea in England. As assistant chief of the construction division in the Office of the Chief of Engineers in Washington from December, 1941, to December, 1942, and thereafter in charge of construction planning for the invasion in the Office of the Chief Engineer, E.T.O., in England until February, 1944, Colonel Itschner has a rich background of military engineering knowledge. This advantage, combined with administrative ability and a rare faculty for conveying to subordinates a feeling of complete fairness and detachment in all decisions, yet a real concern for their personal welfare, accounts to a large degree for the day and night devotion to their jobs that Adsec engineers have displayed since D-day. Moreover, these traits have more value in Adsec than elsewhere, since only here, among the base sections, do the service chiefs—Engineers, Medical, Ordnance, Quartermaster, etc.—command the troops that work for them.

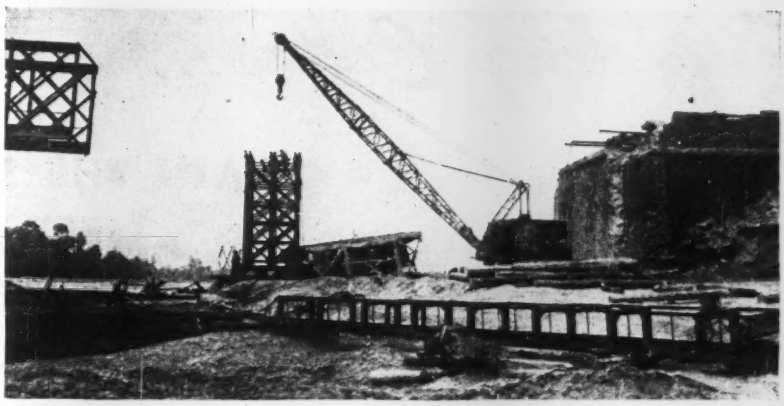


Fig. 4. Railroad bridging is one of Adsec's major activities. Its engineer regiments are especially equipped for such work.

Ably assisting Colonel Itschner and supplementing his special abilities with others surprisingly similar is Col. Alfred H. Davidson, Jr., deputy engineer. An alumnus of the Conchas Dam job in New Mexico, Colonel Davidson was later resident engineer on the Denison Dam outlet works in Texas, his home state; then, head of the engineer department, Armored Forces School, Ft. Knox, Ky.; and finally, assistant district engineer, Louisville District, just before his assignment to the E.T.O. in July, 1942.

The chiefs of the two principal sections into which Adsec engineering is divided are Col. Wilson B. Higgins for railroads and Lt. Col. Lionel E. Reed for general construction. Colonel Higgins in the years immediately before the war was, first, chief of the engineering division of the Los Angeles Engineer District and then district engineer at Huntington, W. Va. Colonel Reed, a division manager for the New England Power Co., served from 1933 to 1941 as executive officer and acting district engineer of the Jacksonville District before going overseas.

May others, well known in peacetime engineering and construction circles, are directing important parts of Adsec's engineering activities, but space permits mention of only four of them, the field commanders of the groups—each made up of general service regiments, port construction and repair units, dump truck companies, etc.—that have been longest identified with Adsec. All four are old hands at construction, and veterans of the last war, too.

Old-Timers in Charge

Col. Harry Hulen had been an engineer inspector on all kinds of heavy construction for many years and was general superintendent of the Mississippi malaria control drainage project just before going to England as commander of the 347th Engineer General Service Regiment. Col. Helmer Swenholt was district engineer at Omaha from 1938 to 1942, when he brought the 332nd Engineer General Service Regiment overseas. Col. Edward H. Coe was occupied in the training of Engineer troops from 1941 to 1943, when he was transferred to England as commanding officer of the 341st Engineer General Service Regiment. And Col. James B. Cress, who was a consultant on electric utility rates and later regional director in San Francisco of the Railroad Retirement Board, went to England as commander of the 333rd Engineer Special Service Regiment in 1943, a year later becoming commanding officer of the 1056th Engineer Port Construction and Repair Group for the work in France.

Building Codes...

EXPLAIN THE SLENDERNESS OF SOUTH AMERICAN STRUCTURES

Arthur J. Boase

Manager, Structural Bureau, Portland Cement Association

WHEN A NORTH AMERICAN ENGINEER sees photographs of South American buildings he is always impressed by the slenderness of the construction. The concrete columns appear almost as rods; the beams and girders narrow to the point of wood joist construction. If the photographs seem striking, you should see a silhouette of the actual job!

Often in South America the entire frame of the building is completed before any walls are installed, and I shall be a long time forgetting my first view of the naked frame of a 16-story apartment building in Rio de Janeiro. It was a very narrow building, standing in an area exposed to all the wind any structure in that vicinity could receive, and to one recently from the States it seemed impossible that mere miles could make such a striking difference. After all, materials of construction would be no stronger there, loads would not necessarily be less, and if permissible stresses were so much higher, then why?

While these multi-story framed buildings are spectacular, the one-story buildings, called "technical buildings" by the European engineer, that is, manufacturing plants, hangars, etc., are more beautiful, more exciting and more interesting. Here it is that the South American engineer has applied his knowledge of the theories of elasticity, mathematics and mechanics more skillfully and thoroughly and, in general, has done his best engineering, both from a design and construction standpoint.

After you have visited a few jobs you begin to get curious about building codes. Usually the building code or type of code gives a definite clue as to what may be expected. At the present time there is a tendency in the United States to make codes so definite that there is little opportunity for the designer to use his great ingenuity to its full and public beneficial effect. Part of this is due to the wishes of building departments and partly to the desire of building code writers to be so specific that there can be no possibility that the designer can misconstrue a single word or phrase in the entire code. The overall result is that U. S. codes are more and more becoming compilations of empirical rules, and the real purpose of codes is being lost.

Building code defined

Fundamentally, a code is a set of minimum requirements the observance of which will safeguard the life and property of a community. It should not be so restrictive in its directives as to force every designer to do what every other designer does, nor should it require every building for any given occupancy to be exactly like every other building that is to be used for the same purpose.

Only recently the building commissioner of one of our large cities requested that a set of rules be devised so that his engineers could use these rules to check every design of a certain type of construction for which permits might be requested. Had these rules been obtained, in my opinion it would have been a step in exactly the wrong direction. Designing engineers, on learning that these rules were to be used to check their designs, would immediately adopt them as design tools, and progress in that type of construction would stop immediately.

Had the various states adopted laws requiring governors to be installed on all automobile engines so that they could not travel over a certain speed instead of wisely adopting speed laws, it is not hard to imagine where the gasoline engine would be today. The situation is not greatly different in the building field. The building code should be prepared and the building department so organized that if a designer can demonstrate that his knowledge and reasoning are sound, there should be no question as to his right to receive a permit for construction purposes.

Inquiry indicated that the cities of the three South American countries I visited (Brazil, Uruguay and Argentina) did have building regulations. Time and space are not available for a detailed study of all of them. I have, however, carefully studied the building code of Brazil and I believe it is timely to review this code in some detail now.

Never before in the

• This is the second of a series of articles by Mr. Boase, analyzing reinforced concrete design practice in South America. His findings are based on observations made last summer when he traveled south of the border under the sponsorship of Engineering News-Record.

• Mr. Boase's intimate knowledge of practice in the United States and Europe provides the background for expert interpretation of what South American engineers have accomplished and how it might be applied in this country.

• In this article he critically examines the Brazilian building code in relation to our codes. His first article, a comprehensive picture of building construction, appeared in the issue of Oct. 19, 1944, vol. p. 499. — The Editors.

United States in my memory have so many interested themselves in building codes as they are doing at this time. The Chamber of Commerce of the United States is on record advising cities to restudy their codes. Many service clubs, groups of architects and structural engineering societies are likewise engaging in this activity. All of this has been brought about by the expectancy of a great postwar building program with promise or hope of new materials. The citizens generally are expectant and anxious that advantage be taken of every technological advance effected by the war effort to improve building construction and if possible lower the cost with safety to the public.

Brazilian code evaluated

The American structural engineer would probably consider the Brazilian code as wide open at both ends and in the middle. One of the most interesting things about it is that which it leaves unsaid. As an illustration, no mention is made of footings. Ostensibly, these South American engineers feel that a footing is merely a design problem in statics and that once the loads have been determined the laws of statics may be applied for the purpose of determining shear and moment and a section of reinforced concrete chosen to resist this external moment and not 85 per cent of it.

One difficulty with American codes is the tendency we have to ride hobby horses, and our codes have their footprints indelibly stamped on the pages. What is believed to be correct is not always written in the code.

The code situation in Brazil is unique. The engineers of Brazil have organized the A.B.N.T. (Brazilian Association of Engineering Codes) and this group has issued, as of 1943, the six Brazilian codes that refer to the calculation and erection of structures. The first two, NB1, "Calculation and Construction of Works of Reinforced Concrete," and NB2, "Calculation and Construction of Bridges of Reinforced Concrete," were published respectively in 1940 and 1941 and were last revised as late as 1943. In that year there was also issued for the first time: NB4, "Calculation and Construction of Combined Slabs" (tile filler slabs); NB5, "Loads for the Calculation of Building Structures"; NB6, "Movable Loads on Highway Bridges"; and NB7, "Moving Loads on Railroad Bridges." The fact that these codes are very new does not mean that they are untried. From my talks with structural engineers working in Brazil I believe the incorporated provisions have in some form been in use for many years.

Fig. 1. Department of Education and Health building in Rio de Janeiro. This structure was designed without the use of the modular ratio. Floor system is an inverted flat slab.

Several interesting things are apparent in this unusual set-up. First, NB1, NB4 and NB5 have to do with buildings, NB1, NB2 and NB6 have to do with highway bridges, and NB1, NB2 and NB7 take care of railroad bridges. This means that the unit stresses and most other details as set up in NB1 apply to buildings, highway bridges and railroad bridges and all other reinforced concrete construction; hence no confusion can exist about one set of stresses applying to buildings, another to highway bridges, and a third to railroad bridges.

What is more important is that these codes are used by everyone engaged in engineering work, and a dozen or more agencies advocating different stresses, different loads and different details are eliminated. It is about as direct and as simple an arrangement as can be conceived, and

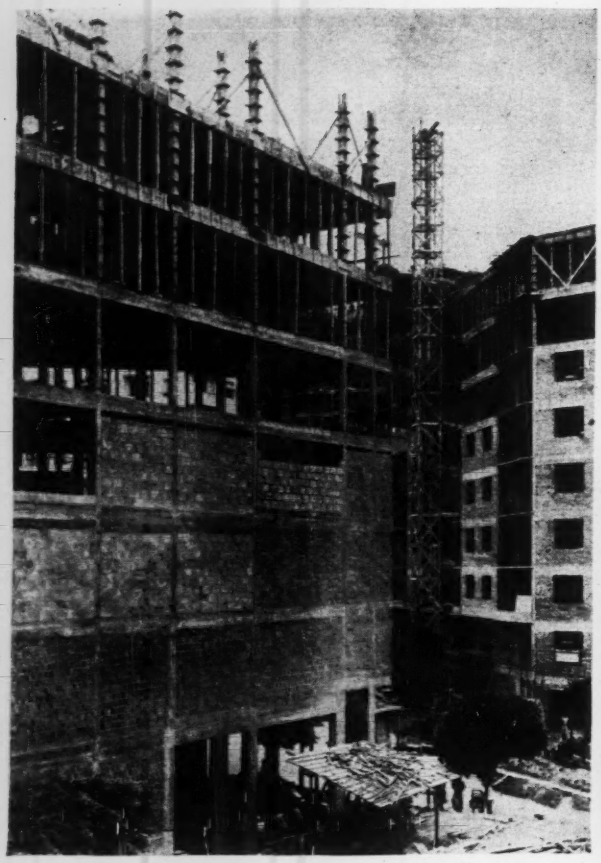


Fig. 2. Typical Brazilian apartment building under construction. The frame is concrete; walls are of hollow tile which will later be stuccoed. First story columns are 12x20 in.; second story, 8x12 in.; and all columns from the third to eighth stories, 8x8 in.

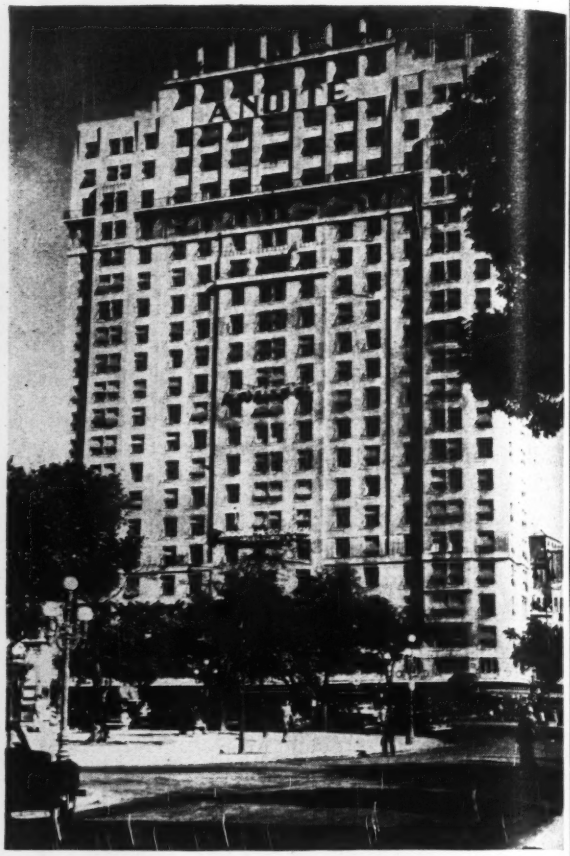


Fig. 3. Twenty-two story "A Noite" building in Rio de Janeiro, which was built about 1928. While the present Brazilian code is new, this structure was designed under about the same rules and has performed satisfactorily for almost two decades.

any arrangement is best and most workable when it has been simplified.

Minimum values for the live loads that must be considered in the design of building frames are fixed in NB5. Here it is stated that these loads, except those which are applied in a special manner, are to be considered as vertical and uniformly distributed. Provision is also made for wind and for loads on parapets. The following table gives the specified live loads in pounds per square foot; for comparative purposes corresponding values as used in New York City are also shown.

		Brazil	N.Y.C.
Apartments	more than 129 sq.ft.	30	40
	less " " " "	40	
Office bldgs.	more than " " "	30	50
	less " " " "	40	
Infirmaries	more than " " "	30	40
	less " " " "	40	
Bldgs. for public gatherings		61	75
Gyms, dance halls		82	100

In addition to the above loads, a paragraph in the Brazilian code requires that ceilings not destined for warehouses be designed for a live load of 10 lb. per sq. ft.

The types of occupancies listed in the above table are the only ones given in the Brazilian code. For other occupancies a paragraph is added which states that any but these will be considered as special cases, and I am led to believe that these are fixed by the various city building departments in consultation with the designing engineer. From my conversations with structural engineers in Brazil I believe there is not a greater difference on heavy duty jobs in design live loads for Brazil and the United States than indicated in the above table.

These differences do not appear to be great, but as one continues through the code the cumulative effect of small differences, together with some very major dissimilarities, can account for all of the wide variations known to exist in the actual structures.

In the calculation of columns and foundations of buildings of more than three floors the live loads for apartment buildings, office buildings and infirmaries may be reduced by 20 percent in the fourth floor counting from the top, by 40 per cent in the fifth, and by 60 percent in the sixth and succeeding floors.

Provision for the calculation of stresses due to wind are made in the following manner: The pressure of the wind is assumed as a function of the height and is designated as q, while the pressure as a function of the type and form of construction is designated as c. The values of q are given in the code as follows:

Below 20 ft	10 psf.
From 20 to 66 ft	12 "
From 66 to 197 ft	17 "
From 197 to 328 ft	20 "
Above 328 ft	27 "

The values listed for the quantity c are as follows:

Flat surfaces which make an angle α with the direction of the wind and where the height may not be more than 5 times the least breadth	$1.2 \sin\alpha$
Where height is more than 5 times the least breadth.	$1.6 \sin\alpha$
In the diametrical plane of cylindrical surfaces	0.7
In the diametrical plane of circular surfaces	0.35
In hollow towers (empty space not counted)	
Windward side	1.6
Leeward side	1.2
Total effect	2.8

The global effect of the wind, which is assumed as pressure and suction, is considered as equivalent to that of a pressure exerted normally on surfaces to the windward and is equal to the product of the above tabulated factors c and q. The code also makes provision for the design of various elements of the structure, such as the walls, to insure their stability against wind pressure when constructed.

Cement, concrete and steel

The strength of the concrete used in the South American countries visited is much lower than we are using in the United States. Cement is manufactured locally and the codes recognize two types—one corresponding to our normal, and another of the high-early-strength variety.

The Brazilian code calls for a minimum of 5.4 sacks per cu. yd., yet it fixes 1,620 psi. as a minimum strength. I do not recall visiting any building job where strengths greater than about 2,700 psi. were being obtained, and in general I think they ran about 2,000 psi. It might be noted, too, that the Brazilian strength requirements are not greatly different from those of the French code of 1934 and the German code of 1932. The United States and Canada seem to be the only countries using extremely high-strength concrete.

Design affected by labor cost

If we believe that with our high-priced labor it is "impractical" to place concrete in such thin members as one sees in South America, it is interesting to contemplate what difference it makes whether we use 2,500-lb. concrete or 200,000-lb. concrete in a building job. We have convinced ourselves that all the good properties of concrete are directly proportional to the strength no matter how that strength is obtained. Might not some of the less desirable properties also be proportional to the strength?

The reinforcing steel used, for the most part, is locally manufactured. The bars are plain and generally are of a grade corresponding to our structural or intermediate quality. United States manufacturers do ship some reinforcing steel to these countries and those bars are of the deformed type. Sizes of bars have not been so closely standardized as in the United States and one sees bars ranging in diameter from $\frac{3}{16}$ to 2 in., and usually by increments of sixteenths.

Unit stress comparisons

The accompanying tabulation furnishes a comparison of permissible unit stresses as used in Brazil in flexural computations for both controlled and empirically proportioned concrete as well as permissible stresses for the two recognized grades of reinforcing steel. For comparative purposes the corresponding values of the American Concrete Institute's 1941 building regulations, the 1932 German code and the 1934 French code have been appended.

COMPARATIVE VALUES OF PERMISSIBLE UNIT STRESSES

	Brazil				
	Empirical proportions	Controlled concrete	A. C. I. 1941	Germany 1932	France 1934
Flexure f_c					
Extreme fibre in compression	640	$0.40f'_c \leq 1070$*	$0.45f'_c$	$0.33f'_c$	$0.28\ f'_c$
Shear					
Beams with no web reinf.	57	$0.04f'_c \leq 114$	$0.02f'_c$ or $0.03f'_c$	$0.033f'_c$	$0.028f'_c$
Beams with properly designed web reinf. but without special anchorage	170	$0.10f'_c \leq 284$**	$0.06f'_c$	$0.12\ f'_c$	$0.07\ f'_c$
Bond					
Beam and slabs	85	85	$0.04f'_c$	$0.04\ f'_c$	$0.028f'_c$ to $0.056f'_c$
Bearing	570	$0.33f'_c \leq 850$	$0.25f'_c$	$0.33\ f'_c$	$0.28\ f'$
Reinforcing steel					
Flexure f_s Str. grade		21,300	18,000	17,000	18,500
Int. grade		25,600	20,000	21,300	fy-p.

* For negative moment at supports add 142 psi.
** Web reinforcing takes all tension.

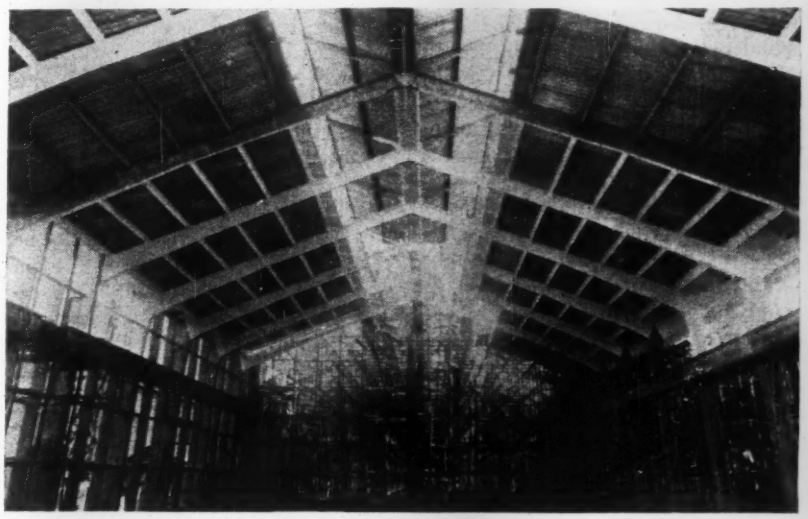


Fig. 4. Eighty-one foot span "technical building". It is on this type of building that the Brazilian engineer has done his best work. This building is 610 ft. long, without expansion joints.

Fig. 5. Medical University building in Buenos Aires, one of the largest buildings in South America. Now under construction, the walls are of architectural concrete and later will be stuccoed.

Values for concrete have been, as near as may be, fixed on a basis of cylinder tests so as to be directly comparable. The table is not intended to be all comprehensive because of limiting conditions usually found in code phrasing, but it does give a good picture of the overall general requirements and establishes many of the principal differences.

The outstanding difference brought out in this table is the variation in permissible stress in the reinforcing steel. At 10 cents per pound one can understand the tendency to high, or what we consider high, working stresses. Not only are these stresses used, but on every occasion designers make the members as deep as possible, thereby unbalancing the section. The Brazilian code does fix a minimum limit on the percentage of steel, and I would expect this minimum to prevail. You fully appreciate the high cost of steel when you see unreinforced footings carrying 24-story buildings.

Two provisions in connection with permissible bond stresses are of particular interest at this time. The first of these states that where bars or bundles of bars with a diameter of less than one inch are used in flexural members the bond stress need not be calculated, but all bars over $\frac{1}{4}$-in. in diameter must be hooked. The second states that where there are bent bars calculated to resist all diagonal tension stresses, twice the perimeter of the unbent bars may be assumed in bond calculations. These are a couple of provisions to think about!

Bundles of bars are defined in the code as follows—two, three or four bars of $\frac{3}{4}$-in. diameter. The spacing of bars or bundles of bars must not be less than $\frac{1}{2}$ in. nor less than the diameter of the bar or bundles of bars. Bundled bars could be very useful in certain types of construction and it is a type of reinforcing that might well be considered in American practice. Consider, for instance, hollow box construction.

Steel protection provisions

A comparison of the specified protection of reinforcing steel as given in the Brazilian code and the A.C.I. building regulations follows:

	Brazil	A.C.I.
Interior bldg. slabs..	0.4 in.	0.75 in
Exterior bldg. slabs..	0.6 "	0.75 "
Interior beams.....	0.6 "	1.5 "
Exterior beams.....	0.8 "	1.5 "
Concrete in contact with ground..... (an additional 2 in. of inferior concrete not considered in calculations)	0.8	3 "
Interior columns....	0.6 "	1.5 "
Exterior columns....	0.8 "	1.5 "

While these Brazilian specifications seem inadequate to us, a check will show that these requirements are not greatly different from those that have been in use in the countries of continental Europe for many years past. Obviously, the Brazilian engineers are distinguishing between protection and fireproofing, and there is a great difference. Where fire is a hazard no one could argue against adequate fireproofing, but where fire is not a particular consideration, is it necessary to force a reinforcement protection sufficient to give fireproofing qualities?

The climate of Brazil, of course, is very mild as compared to that of the United States, and one needs only to travel a short distance in the United States to observe the bad effects of too little protection against weather. It does seem, however, that a greater variation for exposed and unexposed concrete might be considered.

United States codes make very little provision for precast construction and the Brazilian code does not mention it at all, yet good progress is being made in Brazil in this type of building. Here again the theory of mechanics is recognized by the engineers of the building departments as applicable. The steel protections listed above have played no little part in this development. Weight is a very real factor in the field erection of precast members.

The Brazilian code lists about the same general assumptions as are given

in the American Concrete Institute code, that is, concrete does not take tension, the moment of inertia is computed for the concrete section neglecting the reinforcing steel, and there is a straight line variation of stress. Poisson's ratio is fixed at one-sixth.

One of the general provisions in the Brazilian code that is difficult to understand has to do with the modular ratio "n," which is given as 15 for stress calculations and as 10 for calculations that have to do with deflection and moment. It would seem that for the purposes intended the above given values should be reversed.

In general, span length is given as center to center of supports as is done in the A.C.I. code. The one advantage of this assumption is that it is about the only thing known at the time the design is started. Clear span would seem nearer the truth.

Beams and girders

At the outset it is interesting to note that the minimum width of beams and girders is given as 3.2 in. What is more important is that designers very often stay very close to this minimum.

In one office where I visited for some time in order that I might be fully informed regarding general design procedures followed, the very first assumption made on an office building job then under consideration was that all beams would be 4 in. in width. After a final framing plan had been determined upon for any given floor the beams were sketched in with this width. It was then determined which beam on that floor would be the deepest; that fixed the depth of all others. Of course, this gave an unbalanced section in most of the beams, but here again the big consideration was the saving of steel.

Under the Brazilian code it is permitted to compute stresses in beams and girders as those supported on knife edges on center line of columns, with the following limitations:

(1) Positive moments must be assumed at least equal to those which would obtain if perfect fixity existed at the ends of the span in question;

(2) Negative moments caused by live load may be reduced to two-thirds of their computed value if the beams or girders are built integrally with their supports;

(3) On monolithic supports it is permitted to round the moment diagram by assuming the maximum value of the negative moment as the average between the maximum calculated and half the sum of those which occur at the face of the support;

(4) When exact calculations are not made, and assuming the columns, beams or girders as built monolithically with their supports, the moments in the exterior columns are computed as fixed end moment times sum of the column stiffnesses divided by the sum of the column stiffnesses plus the beam stiffness, or

$$\frac{\Sigma K_{cols}}{\Sigma K_{cols} + K_{beam}} FEM;$$

(5) In determining the maximum negative or positive moment the least favorable conditions are assumed to exist when the spans are considered fully loaded or considered entirely unloaded.

One of the basic differences between the Brazilian code and the A.C.I. code is this question of continuity. Continuity itself is not a new thing in the United States, although a maximum discussion of it has flared up in the past fifteen years. Actually the 1928 A.C.I. code called for just about the same or even more rigid requirements than does the 1941 edition. The real difference is that in 1928 and up to 1936 no one did very much about frame analysis or moments in interior columns as far as buildings were concerned.

Between these two dates a new tool for calculation of stresses in frames and other indeterminate structures was introduced to the designing profession. This method caught the popular fancy. It was simple, direct, and required only the use of simple arithmetic after certain constants had been tabulated. Further, it was easily remembered, there were no long formulas to be memorized, and the action of the frame was easily visualized.

Since about 1930 the technical press has been filled with discussions regarding this new procedure. For a time it seemed that everyone interested in the subject was tempted to devise short cuts and variations to its application. Examples were being worked out in every office, even though they were only of an academic type. The net result may have been an overzealousness on the part of designers to apply it to actual structures and in many cases that method, as beautiful and as useful as it is, seems to have been used in many places where it did not properly apply, and it well could be that it is being overworked.

The present A.C.I. code, after speci-

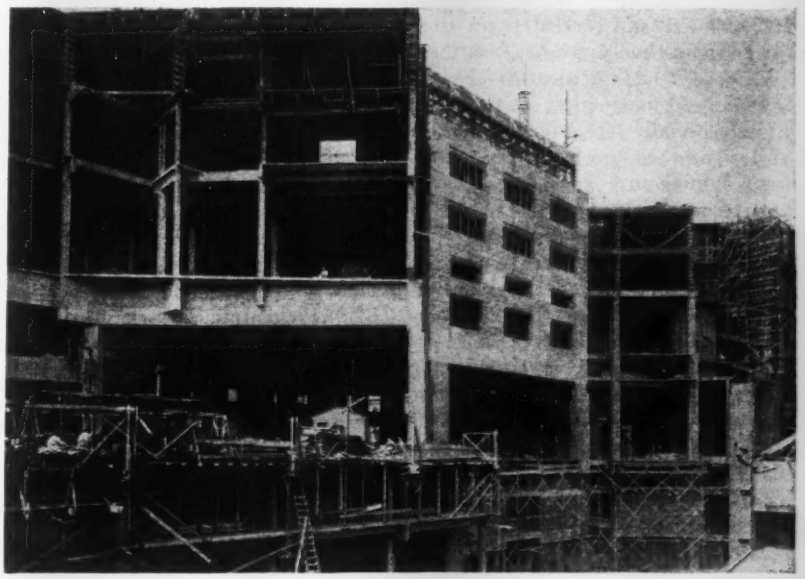


Fig. 6. Bank of the Nation building in Buenos Aires. The concrete wall has a span of about 83 ft. and was computed as a 4-story Vierendeel truss by the slope deflection method. Single footing under the center double column carries a load of 6,600 tons.

Fig. 7. Circular footings without reinforcing steel and resting on gravel carry over 1,600 tons. Eventually they will support a 24-story building.

fying that building frames shall be designed by the theory of elasticity, has this to say: "Approximate methods of frame analysis are satisfactory for buildings of usual types of construction, spans and story heights." The words "approximate methods" cover a vast territory.

The Germans are often given credit for great excellence in their design work in reinforced concrete. Just before the war and several years after the Germans had put into effect their 1932 code, I had the pleasure of visiting many of their cities. At that time I was especially interested in the type of design procedure they were following. I think my experiences can all best be summed up by the statement of the assistant chief engineer of a very large firm (they were employing 250 structural designers then) in Berlin. He estimated that 90 to 95 percent of all the buildings being designed in his office were from the tables of "Zement Kalendar." These tables assume knife edge supports and are not concerned with bending in columns. I think the designing in France could also be listed as by "approximate methods." At the present time it is very possible that overemphasis is being placed on the elastic theory rather than the approximate method idea.

It is quite proper that a code should provide for unusual building layouts, as the A.C.I. code does, but it is also proper that designers and building departments appreciate what is unusual and what isn't and that quick, easily applied methods be permitted where conditions warrant, and this will be in most cases.

One-way slab design

The Brazilian code fixes the minimum thickness of slabs as 2 in. for roof slabs, $2\frac{3}{4}$ in. for floor slabs which do not carry vehicles, $4\frac{3}{4}$ in. for slabs which do carry vehicles. (I believe vehicles in this particular case means automobiles, trucks, etc.). These minimums apply to one-way, two-way or ribbed slabs.

Further general limitations are as follows: The usable depth of slabs must not be less than (a) 3 per cent of the theoretical span for simple spans, slabs not fixed at both ends, and in the end span of continuous slabs not fixed at the ends; (b) $2\frac{1}{2}$ percent of the theoretical span in slabs fixed at both ends and in continuous spans not included in (a). In ribbed slabs the above percentages are to be applied to a fictitious span one and one-half times the actual span. In the case of two-way slabs supported on four edges, if the longer span is not more than one and one-half times the shorter, the above percentages apply to a fictitious span two-thirds of the actual span.

These limitations call for much thinner slabs than we are used to and to read about them without having seen them makes one wince. They did not originate in Brazil, however. They have been in use in Germany and other European countries for many years and, to the best of my knowledge, have proved satisfactory.

The provisions for the calculation of one-way slabs are about as given for beams, except that the negative moment due to live load may be reduced by one-half instead of one-third, as in beams, when they are built integrally with their supports.

Where the smaller span is not less than 80 percent of the larger, the moments may be determined by the formula $M = \frac{wl^2}{k}$ where l is the average clear span of adjacent slabs. The following values of k are given:

	Brazilian Code		A.C.I. Code
	Haunched	Uniform Thickness	Uniform Thickness
More than 2 Spans			
Negative moment first interior support	−8	−9	−10
Other interior supports	−9	−10	−11
Two Spans			
Intermediate support	−7	−8	−9
Positive moments			
End span	+12	+11	+11
Intermediate spans	+18	+15	+16

Negative moments in slab spans may be calculated as $M = \frac{l^2}{24}\left(w_d - \frac{w_l}{2}\right)$ where

l = longer span.
w_d = dead load per sq. ft.
w_l = live load per sq. ft.

The A.C.I. code, it should be noted, uses clear span in case of slabs and has given no coefficients for haunched slabs. To me, both the Brazilian and the A.C.I. code coefficients look "fussy" considering the many assumptions made and the known uncertainties.

Load distribution on slabs

Provision is made for the distribution of concentrated loads on slabs as follows:

Loads concentrated or partially distributed may be extended in the direction of the principal reinforcement over a distance $a' + 2e'$ (see Fig. 8 for nomenclature) and the breadth of strip of the slab may be taken as $b = a'' + 2e'$. The value of b may be increased as follows: (1) from 6.5 ft. up to $b = \frac{2}{3} l$ in the calculation of flexure if the load is more than 3.25 ft. from the support; (2) from 3.25 ft. up to $b = \frac{1}{3} l$ in shear calculations if the load is more than 1.62 ft. from the support; (3) $2a'' + 5d$ in shear calculations if the load is near the support.

Another limitation is that b cannot be greater than the breadth of the slab or the distance from center of load to edge of slab increased by 2. Distributing reinforcement shall not be less than ten per cent of the main bars.

REPRODUCTION OF A TABULATION CHART USED IN BRAZIL TO FACILITATE THE APPLICATION OF THE MARCUS METHOD FOR DESIGNING TWO-WAY SLABS

l_y / l_x

$M_x = +\frac{w l_x^2}{m_x}$ $M_y = +\frac{w l_x^2}{m_y}$ $M_x = -\frac{w l_x^2}{n_x}$ $M_y = -\frac{w l_x^2}{n_y}$ $w_x = K_x w$

l_y/l_x	m_x	m_y	n_x	n_y	K_x	l_y/l_x	m_x	m_y	n_x	n_y	K_x
1.00	55.7	55.7	24.0	24.0	0.500	1.50	32.0	72.2	14.4	32.3	0.835
1.01	54.8	55.8	23.6	24.0	509	1.51	31.9	72.8	14.3	32.6	838
1.02	53.9	55.9	23.1	24.0	519	1.52	31.7	73.4	14.3	32.9	842
1.03	53.0	56.0	22.7	24.1	528	1.53	31.6	74.0	14.2	33.2	845
1.04	52.1	56.0	22.3	24.1	538	1.54	31.4	74.6	14.2	33.6	848
1.05	51.2	56.1	21.9	24.2	547	1.55	31.3	75.2	14.1	33.9	851
1.06	50.3	56.2	21.7	24.2	556	1.56	31.1	75.8	14.0	34.2	855
1.07	49.4	56.3	21.2	24.3	566	1.57	31.0	76.4	14.0	34.5	858
1.08	48.5	56.4	20.9	24.3	575	1.58	30.8	77.0	14.0	34.9	861
1.09	47.6	56.5	20.5	24.4	585	1.59	30.6	77.6	13.9	35.2	865
1.10	46.8	56.6	20.2	24.4	594	1.60	30.5	78.2	13.8	35.5	868
1.11	46.2	56.8	20.0	24.5	602	1.61	30.4	78.8	13.8	35.8	870
1.12	45.6	57.0	19.7	24.6	610	1.62	30.3	79.5	13.7	36.1	873
1.13	45.0	57.3	19.4	24.7	618	1.63	30.2	80.2	13.7	36.2	875
1.14	44.4	57.5	19.2	24.8	626	1.64	30.1	80.8	13.7	36.8	878
1.15	43.8	57.7	18.9	25.0	634	1.65	30.0	81.5	13.6	37.1	880
1.16	43.2	58.0	18.7	25.1	643	1.66	29.9	82.2	13.6	37.5	883
1.17	42.6	58.2	18.4	25.2	651	1.67	29.8	82.8	13.6	37.8	885
1.18	42.0	58.4	18.2	25.3	659	1.68	29.7	83.5	13.5	38.1	888
1.19	41.4	58.7	18.0	25.4	667	1.69	29.6	84.2	13.5	38.5	890
1.20	40.9	58.9	17.8	25.6	675	1.70	29.4	84.9	13.5	38.8	893
1.21	40.5	59.2	17.6	25.7	682	1.71	29.3	85.6	13.4	39.1	895
1.22	40.1	59.6	17.4	25.9	688	1.72	29.2	86.4	13.4	39.5	897
1.23	39.7	59.9	17.3	26.0	695	1.73	29.1	87.1	13.4	39.9	899
1.24	39.3	60.3	17.1	26.2	701	1.74	29.0	87.9	13.3	40.2	901
1.25	38.9	60.6	16.9	26.4	708	1.75	29.0	88.6	13.3	40.6	903

Joist floor construction

Concrete joist floor construction in Brazil consists of concrete joists and slabs placed monolithically with inert fillers. The A.C.I. code also considers what is known as pan construction.

Joist floor construction may be computed under the Brazilian code using the provisions given under "One-Way Slabs" with these limitations: Minimum thickness of ribs, 1½ in.; minimum thickness of topping 1½ in. (A.C.I. 1½ in.) or 1/15 of free distance between ribs. (A.C.I. 1/12).

Resistance of topping to flexure and resistance of the ribs to shear must be checked when there is a concentrated load or where the distance between ribs exceeds 20 in. Bridging must be used when concentrated loads are applied or where span is more than 13 ft. Two bridgings are required when the span is more than 20 ft.

Two-way slab construction

There are three solutions to this problem permitted: (1) assuming a grillage of rectangular beams or strips, for uniform load the part carried in either direction is determined by assuming middle strips and computing the load on each so as to give the same deflection at their center of intersection; (2) as an isotropic or orthotropic plate using the theory of elasticity and assuming Poisson's ratio as 1/6; and (3) by the approximate method of Marcus.

As a practical matter, the method of Marcus as used in Germany for many years is almost always the one used in Brazil. Charts and tables are readily available in South American countries for all cases to be met with in practice. The accompanying tabulation is a partial reproduction of one of a complete set secured on this trip. The one shown is for the case of continuity on all sides and its ease of application can be noted from inspection.

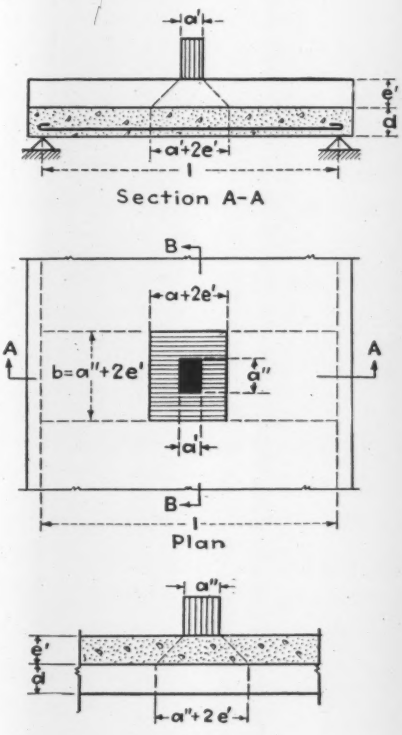


Fig. 8. Nomenclature diagram for computing distribution of concentrated loads on slabs.

The results to be obtained by this method are not greatly different from those secured by use of the method given in the A.C.I. code. However, the work is facilitated by use of these tables, and the one big difference in the results is brought about by the difference in minimum depths permitted.

Mushroom flat slab design

Mushroom flat slab types of construction must be calculated by one of two given methods: (1) as a plate by the theory of elasticity assuming the material either isotropic or orthotropic; or (2) as continuous beams integral with the columns, the slab to be divided into two rectangular beams in both directions.

The distribution of the moments, considering a panel divided into four equal strips, is as follows: 45 per cent of the positive moments to be taken by the two inner strips and 27½

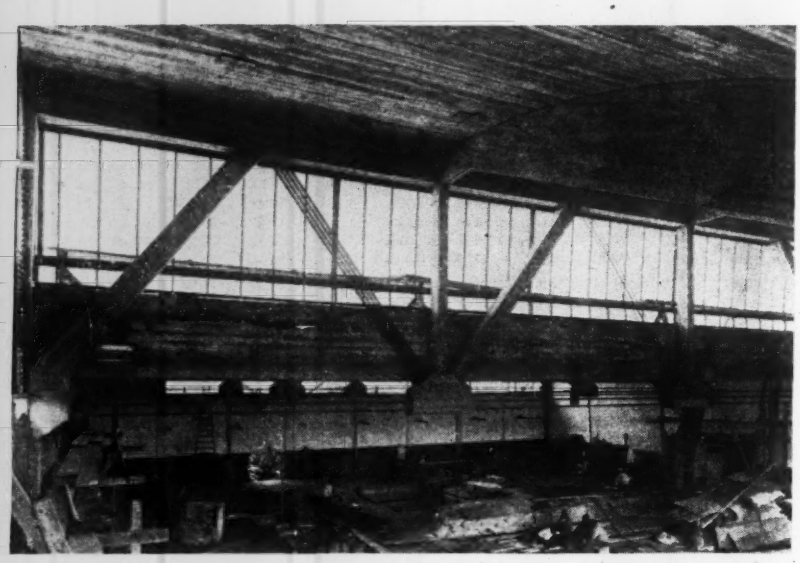


Fig. 9. Concrete roof trusses of 85-ft. span. Note that the tension members are left exposed.

percent for each of the outer strips; 37½ percent of the negative moments for each of the outer or column strips and 25 percent for the two inner or middle strips.

After all, this type of construction is strictly a United States invention and more of it has been built in our country than in any other. Likewise, test after test of actual buildings has been made in the United States and it is surprising, in view of all the data that have been published, not to find in the Brazilian code a table of moment coefficients for regular layouts such as covered by the A.C.I. code.

The continuous beam method (see method 2 above), however, has been in use in Brazil for many years. I made some effort to determine how many. I am sure it is more than ten, and probably nearer twenty years. It did not occur in an American code until 1911, and I am certain that no one responsible for that method as now being used in the United States had any idea that it was being used in Brazil or elsewhere. The A.C.I. code, it might be added, makes certain justifiable assumptions which would reduce the cost of this type of construction over the Brazilian method.

Column design procedures

The differences in column design the world over will never cease to intrigue. Given the same test data, no two groups seem to arrive at the same conclusions. Witness the findings of the A.C.I. column committee and the Chicago and New York code committees. Two of the greatest changes made in the design of reinforced concrete in the past years in the United States have had to do with elimination of the modular ratio "n" from column design methods and consideration of the gross area of the concrete.

The Brazilian code has this to say: "In the calculation of members subject to axial compression it is permitted that the resistance be taken as that of the permissible resistance of its elements (concrete and steel) considered separately."

For tied columns the longitudinal reinforcing is fixed at 0.8 to 6 per cent. However, this lower limit may be reduced to 0.5 percent when the height divided by the least dimension $\leqq 15$. The least dimension of tied columns must not be less than 8 in. nor less than 1/25 of the height. Spacing of ties shall not be greater than the least dimension of the column nor greater than 21 diameters of the longitudinal bars nor greater than

$$340 \times \frac{(\text{dia. of tie})^2}{(\text{dia. of longitudinal steel})}$$

nor greater than 12 in.

In spiraled columns only the core is considered, and the effect of the spirals is considered as increasing the resistance of the concrete by an amount equal to the percentage of spiral times the elastic limit of the steel. For spiraled columns the longitudinal reinforcing is fixed at 0.8 to 8 percent. The spacing of spirals must obey the following rules

$\leqq$ 1/5 the diameter of the core or $\leqq$ 3.2 in.

and

volume of spiral of column $\geqq$ 0.005 volume of the core $\geqq$ times the volume of the longitudinal steel.

The buckling effect does not need to be computed for members subjected to axial compression whose ends are not free or

$$\text{(a) where } \frac{\text{height}}{i} \leqq 50$$

$$\text{(b) where } \frac{\text{height}}{i} > 50$$

if the load has been divided by $\left(1.5\text{–}0.01\,\frac{l}{i}\right)$ where i equals the least radius of the inscribed circle of a tied column or the core of a spiraled column.

The unit stresses prescribed for columns are as follows:

On the concrete for axial compression or combined bending and direct stress $\frac{f'_c}{3} \leqq 850$ psi.

at center of section, $\frac{f'_c}{2.5} \leqq 1{,}070$ psi. at edge of section. (Under certain conditions this may be raised to 1,560.)

On the steel for axial load and combined flexure (average stress)

structural grade steel 17,000 psi.

intermediate grade steel 21,300 psi.

For combined flexure (maximum stress)

structural grade steel 21,300 psi.

intermediate grade steel 25,600 psi.

Ultimate design considerations

It was a pleasant surprise to find a clause in the Brazilian code that permits design on an ultimate design basis as follows: In structures not subject to heavy vibration or shock it is permitted that members in flexure be dimensioned as a function of the rupture load. It is assumed that the stress on the concrete is uniform and equal to 75 percent of its 28-day strength. Failure of the steel is assumed to occur when the elastic limit is reached, and these stresses are further assumed to occur simultaneously. A factor of safety of 2 is pre-

scribed. You just can't poke a modular ratio "n" into this method. At the present time American practice has forgotten the value of "n" in its column design, but still insists on having it in the design of the floor system.

Many able men have advocated such a procedure for years. In 1937 the Instituto de Pesquisas Technologicas de Sao Paulo issued a brochure, *Os Novos Methodos de Dimensionamento das Pecas Flectidas de Concreto Armado*, by Telemaco Van Langendonck, in which are described ultimate design methods proposed by Emperger, Bittner, Michielsen, Kazinczy, Gebauer and Steuermann. This brochure has been thoroughly circulated all over Brazil and the engineers there have not only studied it but they have studied the writings of many other men on the same subject, including the work of C. S. Whitney of Milwaukee, *Trans.* A.S.C.E., vol. 107, "Plastic Theory of Reinforced Concrete Design."

More recently Dr. Vernon P. Jensen of the University of Illinois presented an able paper, "The Plasticity Ratio of Concrete and Its Effect on the Ultimate Strength of Beams," in the *Proceedings* of the American Concrete Institute, 1943. Not only have the engineers of Brazil studied these methods, but they have actually applied them. It should not be inferred that the ultimate design method has replaced the classic procedures there, but good buildings have been built where this method was used.

The only other country I know of which uses this method is Russia. The Soviet government recognized the advantages of this scheme by issuing instructions which stated explicitly that their adoption had for its aim the lowering of the cost of construction within certain limits of safety, and originally they used a factor of safety of 2.2. In 1942 the Soviet Union adopted "balanced design" and the following interesting table briefly indicates the factors of safety being used there.

	$w_l \div w_d$		
	Less than 0.5	0.5 to 2.0	More than 2.0
Columns, arches, etc., mostly under compression	1.8	2.0	2.2
Beams, girders, etc.	1.6	1.8	2.0

w_l = live load w_d = dead load

These factors of safety are used officially for all public works in the Soviet Union.

Ultimate design is not a new procedure in Russia. Over ten years ago Dr. Steuermann reported having designed more than 10,000,000 sq. ft. of buildings of the flat slab variety using the then current A.C.I. specifications and ultimate design procedures and showed a saving of over ten per cent. I visited one building in Brazil with the designing engineer where this method had been employed with a resultant saving of about 15 percent.

It is surprising that American engineers, among the best and most progressive in the world, have failed to give more study to the advantages of such a scheme. Everyone with whom I have talked who has actually used the method states that it is easier to apply and that a saving in cost follows. Certainly there can be no argument as to the better agreement between laboratory results and calculations, and surely with this scheme it would be possible to have a known factor of safety. Unit stresses as we are applying them in our designing today are almost meaningless.

In this brief review of the Brazilian building code I have tried to point out the main similarities and great dissimilarities between South American and North American practices. Anyone reading the Brazilian code would recognize the tremendous influence of and the similarity to the German code. As I see it, the South American engineers have merely gone the Germans one better.

One gets a qualitative idea on reading a code, but just what difference does a code make in an actual design? To answer this question I brought from South America plans of buildings designed under their laws. These have been redesigned using the American Concrete Institute code, and in my next article I will make a quantitative comparison so that a better picture of the differences may be visualized.

I am greatly indebted to Prof. Harvey L. Johnson of the Romance Language Department of Northwestern University for a translation of the Brazilian code. It is not easy in this country to find one who can translate Portuguese into English, and especially is that true when dealing with technical subject matter.

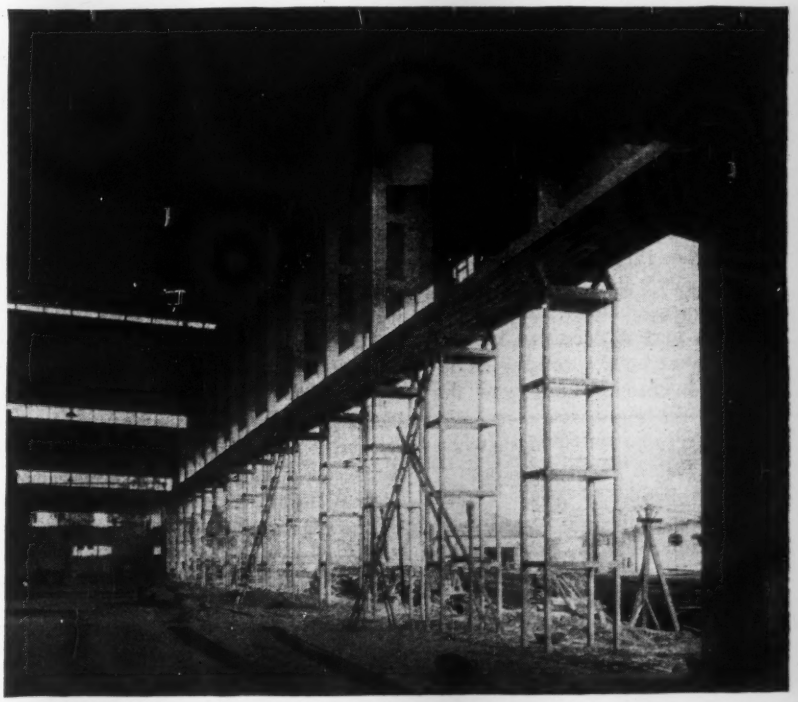
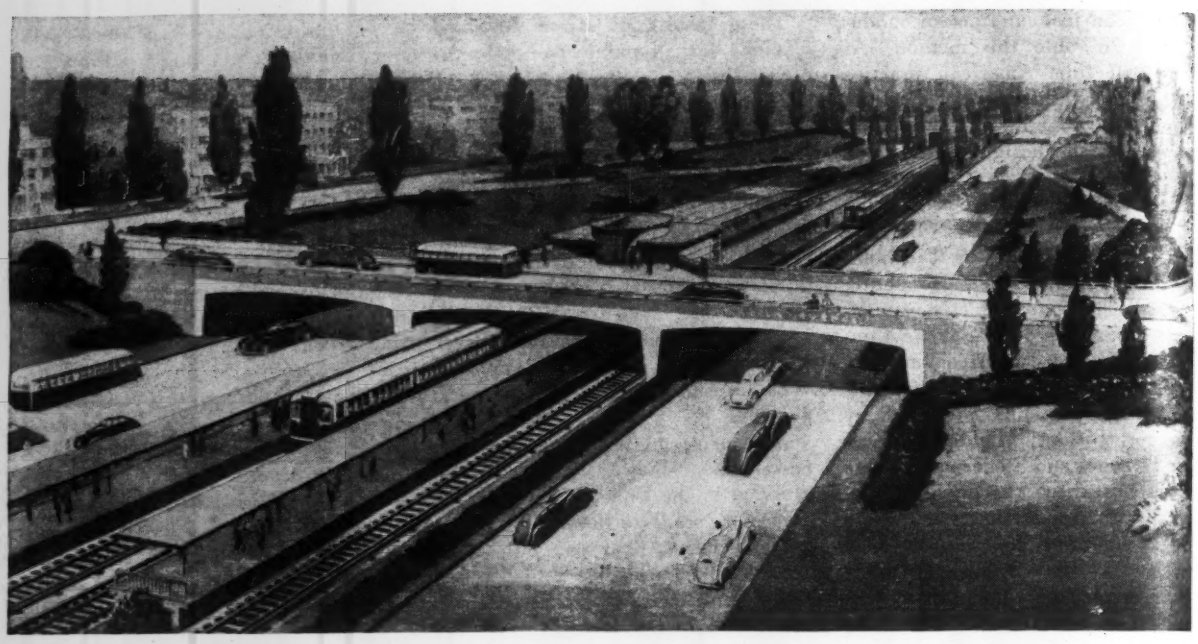


Fig. 10. Repair shop hangar in Rio de Janeiro. Two concrete doors 25x122 ft. will be cast horizontally and rotated into place. Note shoring members, which are monolithic concrete frames.



Eight lanes of traffic and four rapid transit lines will be carried in Chicago's new Congress Street Expressway.

Chicago Plans an Eight-Lane Expressway

***Contents in Brief**—Design plans are well advanced, right-of-way is being acquired and initial construction funds have been allocated to build the 8-lane, $45,000,000 Congress Street Expressway in Chicago. Planned for early construction after the war, this 8-mile superhighway will relieve badly congested traffic on the city's West Side.*

YEARS OF PLANNING, persistent efforts of Chicago's engineers and educational publicity has advanced the much discussed Congress Street Expressway from the "dream" stage to one of that city's first major postwar highway improvements. Long recognized as an urgent necessity in alleviating congested traffic conditions between the downtown Loop and the West Side, the expressway recently was advanced to an active status when the Illinois State Highway Department gave approval to proceed with plans and announced it would participate in the cost to the extent of its financial ability.

The expressway will be 8 miles long and is estimated to cost $45,000,000, nearly one-half of which will be expended for the purchase of right-of-way. It will originate at Field Drive in Grant Park and extend westward along the general line of Congress St. to the city limits at Austin Boulevard. From this point the state and county plan improvements which will connect the expressway to Mannheim Road, highway U. S. 64 and with the proposed interregional highway system west of Chicago.

Provisions also will be made to funnel West Side traffic into downtown Chicago by routing heavily congested traffic now using four main east-west streets; Washington Boulevard, Roosevelt Road, North Avenue and Cermak Road, over the new expressway, when completed.

To serve congested area

It is estimated that a total of 37 sq. mi. of city area will benefit directly by completion of the Congress Street Expressway, including certain improvements to the existing West Side rapid transit system to be built in conjunction with the expressway. Some 940,000 people reside in this area, which includes eleven communities, portions of six other communities, and has an average population density exceeding 25,000 persons per square mile. Completion of the expressway will restore many narrow neighborhood streets, now inadequately handling through traffic, to the purpose for which they were intended: local traffic and parking facilities.

Major portion to be depressed

Starting at its eastern terminus in Grant Park, the expressway will be carried at street grade to Wells St. West of Wells St. it will be elevated for six blocks, crossing the South Branch of the Chicago River, passing through the new U. S. Postoffice building and over Canal, Clinton, Jefferson and Desplaines streets. The major portion of the expressway, however, extending from the west side of Desplaines to the city limits will be depressed in an open cut.

Four traffic lanes will be provided in each direction, separated by a median strip. Within the Loop area, express pavements will be 42 ft. wide

in a right-of-way ranging in width from 96 to 167 ft. West of Canal St., these pavements will be 48 ft. wide in a right-of-way of 528-ft. maximum width. Starting at Desplaines, west of the Loop, a strip of land generally equal in width to a city block is being secured for right-of-way.

All north and south streets within the Loop area will cross the expressway at grade. Outside of the Loop, all pedestrian and vehicle cross-traffic at grade will be eliminated. Important north and south streets will be carried over the depressed section, but some minor streets will terminate on each side. These, however, will have access by ramps to the expressway from service roads to be built parallel to the express pavements. Access and egress ramps will be provided at frequent intervals along the depressed section.

A total of 32 crossings and bridges are planned to carry existing street traffic over the depressed section. In addition there will be eight pedestrian overpasses, six underpasses for the elevated portion of the highway, and three railroad grade separations.

To bridge the Chicago river

Largest single bridge in the project is the proposed crossing of the South Branch of the Chicago River, estimated to cost $1,750,000. This twin-bascule bridge will be, in reality, two structures built side by side separated by a narrow median, with each structure carrying a 43-ft. roadway for four traffic lanes and one 6-ft. sidewalk. The bridge will have a 24-ft. maximum vertical clearance for a clear channel width of 100 ft. It will be skewed 61 deg. with the centerline of river. As planned, the bridge will measure 107 ft. out-to-out of sidewalks with abutments set 169 ft. apart, measured perpendicularly to the river.

High-speed express traffic will be distributed into the Loop area by a large plaza between Franklin and Wells streets. West of the Chicago River the expressway will pass through a large portal in the new U. S. Postoffice building.

One of the most discussed issues in planning the Congress Street Expressway was whether it should go through the new U. S. Postoffice building just east of Canal St., or be so located as to bypass it. Final decision is to carry the expressway through a 120-ft. wide portal in the Postoffice building, in accordance with the terms of the "Union Station ordinance," under which the post office was built.

Large distribution plaza

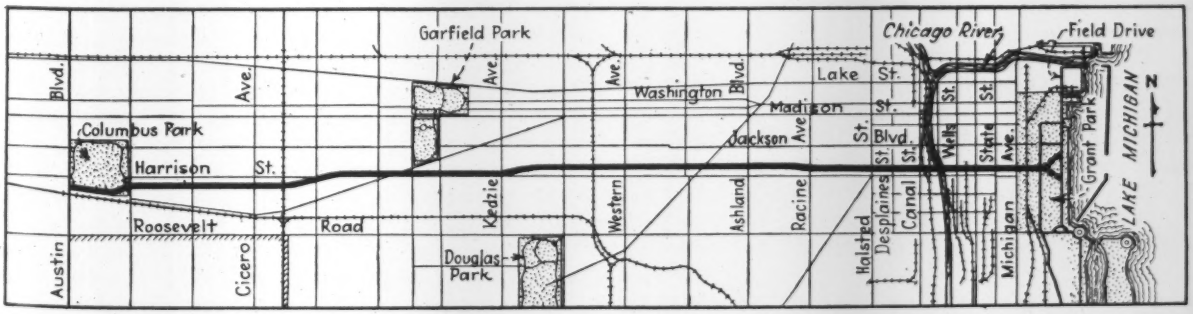
In the entire area between Wells and Franklin, running north and south, and the east-west streets, Van Buren and Harrison, there will be a large distribution plaza for express traffic entering and leaving the Loop terminal area. Although not included in this project, it is planned to extend Wacker Drive south to connect with this plaza and thus gain access to the expressway.

Virtually all right-of-way has been bought from State St. to the Chicago River, representing an investment of $2,198,300. The city also has received state authority to purchase right-of-way between Desplaines St. and Ashland Blvd. Cook County is providing the right-of-way between Canal and Desplaines St. State, federal and county agencies are expected to obtain the remainder of the required right-of-way.

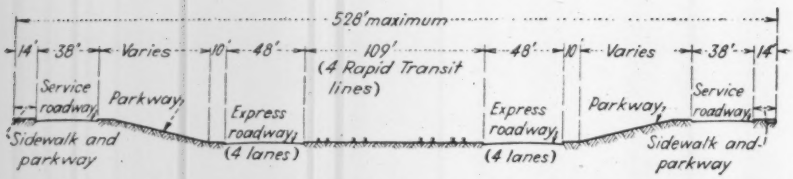
Right-of-way is secured in Chicago by negotiation and condemnation. In all cases appraisal of the property is made. Even when a purchase price is agreed upon, friendly condemnation proceedings usually are filed in court.

Plans 60 percent completed

As evidence of the progress made to date on preparation of plans, basic studies are 100 percent complete while some 60 percent of the design studies have been finished. Funds also



Starting at Field Drive in Grant Park, the superhighway will extend eight miles west along the Congress Street line to the city limits of Austin Boulevard. Connections with the interregional highway system west of Chicago are planned.



Right-of-way outside of the Loop area, in general, will be one block wide to accommodate two expressway pavements, four rapid transit lines, service drives and sidewalks. Inside the Loop area right-of-way will vary from 96 to 167 ft.

have been accumulated to enable construction to begin as soon as federal approval is secured, and men and materials become available. Nearly $16,000,000 of city and county funds have been appropriated for construction; with the county allocating $4,800,000 and the city slightly more than $11,000,000. The extent to which the state will participate, however, has not been established to date. That will depend upon the amount of federal aid money allocated to the state for city and urban highway construction.

Completion of this high-speed, limited access thoroughfare from Grant Park to the west city limits will provide many benefits to the traveling public. In addition to the efficient collection and distribution of traffic in the congested West Side area, the expressway will provide unimpeded service for intercity traffic enroute to the heart of Chicago. It will permit a time saving of 15 min. during rush hours and 10 min. during normal traffic from Austin Boulevard to the Loop. An estimated 23,000,000 cars will use the new expressway annually, or 67,000 per average week day. There should be a substantial reduction in traffic accidents, while operating costs of vehicles using the new superhighway will be reduced materially.

West Side subway planned

In connection with the proposed Congress Street Expressway, a comprehensive West Side subway system is being planned and it is expected that a part of it will be built along with the expressway. Plans are to complete the Milwaukee-Lake-Dearborn St. subway, 80 percent finished when its construction was stopped on account of the war, and to build a West Side subway located in the center parkway of the Congress Street Expressway.

The new subway would connect with the Milwaukee-Lake-Dearborn St. subway (commonly called the Dearborn St. subway) just west of Franklin St. in Congress St. It will pass under the river in twin tubes to a point just east of Halsted St. where it will emerge in the median strip of the expressway. Four express tracks will be provided from near Halsted St. west to Kedzie Ave. At this point, two tracks will connect with the existing Garfield Park elevated rapid transit line. The other two tracks will turn north in a subway to be built at this point and connect with the Lake St. elevated near Homan Ave. A connection also is planned with the Douglas Park elevated line at Marshfield where Douglas Park trains will enter and leave the subway.

Future subway plans also include a connection with the Lake St. leg of the Dearborn St. subway by a two-track subway running north in Clinton St. to Canal and Lake streets. This branch will complete the formation of an underground subway loop in the central business district, permitting flexible train operation to and from the west and northwest sections of the city. The Dearborn Street subway, when completed, will form three sides of this loop.

The West Side subway is estimated to cost $33,500,000 and it will be financed from traction funds, by savings resulting from operating costs of the rapid-transit system and by a federal grant, if available. It will have a total of 16 miles of track, of which 12 miles will be available for express service.

Design engineers

Plans for the Congress Street Expressway as well as those for the West Side subway are being prepared under the supervision of Philip Harrington, commissioner of subways and superhighways. V. E. Gunlock is chief engineer, Dick Van Gorp is assistant chief engineer and Walter E. Rasmus is engineer of design.

Oil Drums Buoy 1,700 Ft. of Pipe While Being Floated to Place

Empty oil drums, wire rope and a bulldozer were the principal items of equipment used at an advanced naval base in the Pacific for getting a water supply across a 1,700-ft. arm of the sea. The work was completed in two days by Seabees working under direction of Comdr. C. T. Wende, Seattle, Wash., who devised the program.

The available pipe, 4 in. in diameter, was in 20-ft. lengths with threaded connections. After the couplings had been screwed up tightly joints were welded for additional strength, making sure that welds covered all visible threads. The line was then pushed out with a bulldozer, aided by a wire rope from the forward end of the pipe that had been passed to the far shore for guiding and assisting in the pull. As the advancing end of the pipe reached the water's edge, beneath it were placed buoyancy units consisting of pairs of empty 50-gal. drums welded together to form a saddle or cradle in which the pipe could be supported. These pairs of drums were spaced at 60- to 80-ft. intervals.

When the pipe was all the way across the inlet a rowboat moved from one to another of the buoyancy units and a pick was used to make holes in both ends of each drum. This caused the buoyancy units to fill with water and sink slowly.

Special attention was required in the matter of anchorage to make the pipe secure against action of ocean currents. It was decided that concrete anchors were needed at four points and that it would be best if these could be attached to the pipe by chains. As water depths ranged up to 110 ft. there would be advantage in sinking the anchors with the pipeline, thus avoiding need for a diver. The plan used was to make anchors out of drums filled with concrete, attach these to the pipe with chains at the shore line and float the anchors out with the pipe, supporting the anchors on additional drums, which also were punctured at the time of sinking.

Fig. 1. Four barges, framed in pairs and set transversely to the flow of the stream, were placed between the pile bents.

We Bridge the River Seine

Col. William C. Hall
Corps of Engineers

***Contents in Brief**—After the German rout in France, two military bridges across the Seine were ordered replaced with permanent type structures. At Fontainebleau, where the river was 480 ft. wide, a combination of pile bents and 14 barges were used to bridge the gap in six days, despite difficult supply problems. Under similar conditions at Montereau four barges, framed in pairs, were placed transverse to the flow of the stream between pile bents, and the crossing was completed in ten days.*

FOLLOWING THE BREAKTHROUGH on the Cotentin peninsula, toward the end of July, the American forces drove to Rennes. This road and rail center was the key to the Brittany peninsula, but in addition to exploiting this area, General Patton's Third Army threw a spearhead eastward to Le Mans.

The German Seventh Army attempted to break through this salient in the direction Mortain-Avranches, but the Allies and the American 30th Division in particular blocked the German threat. Meanwhile, the Third Army, with its right on the Loire, drove toward Paris, reaching the Seine the third week in August above and below that city. With the German Seventh Army trapped between our forces and the bridgeless Seine, the 20th Corps smashed across the Seine at Melun and Fontainebleau and headed east toward Germany.

On August 27, there were two Bailey bridges at Melun, an M-2 treadway at Fontainebleau, a heavy pontoon bridge at Montereau, and Class 40 Bailey bridges on damaged bridge spans at Fontainebleau and Champagne. These portable bridges would be needed on the Meuse or Moselle; so the order was given to the 1306th Engineer General Service Regiment to bridge the Seine at Fontainebleau with a permanent type two-way Class 70 bridge and at Montereau with a permanent type Class 40 structure.

The regiment had received basic training at Camp Ellis, Ill., had served in England and had been in support of the 20th Corps since Aug. 6. This was its first major construction assignment. It was fortunate to have attached the 609th Engineer Light Equipment Company and the 572nd Engineer Dump Truck Company (less a platoon). Throughout the operation, these units worked with admirable skill and energy.

The water gap at Fontainebleau proved to be 480 ft., with a maximum depth of 17 ft. The river bottom was gravel. Banks were favorable, except for a swampy area on the north shore. Since the river is controlled, there was very little river current.

Piles and barges form bridge

A 550-ft. timber structure was planned, using piling and river barges. The job was assigned to the 1st Battalion, under Lt. Col. Robert C. Horne, and the actual erection was performed by B Company, commanded by Capt. Glen C. Williams.

Preliminary material reconnaissance reports had been disappointing. About fifteen usable piles, a small amount of three-inch lumber,

Fig. 2. At Fontainebleau 14 barges, 12 of them parallel to the shore, were used in crossing the Seine. Stringers are 12-in. I-beams and decking is 3x12.

and three barges had been located. Further reconnaissance produced a great mass of materials, but little was suitable. The French simply do not use the 12 x 12 timber caps, the 6 x 12 stringers, or the 4 x 12 flooring required. Piles were cut from standing timber and steel beams of every size, cross section and length were accumulated. Fourteen suitable gravel barges with a displacement of about 500 tons each were obtained and towed to the site.

Although materials reconnaissance continued throughout most of the construction, the mass of the lumber actually used was obtained on order from French mills, but the production of lumber met with difficulties, since there was no local supply of electricity and the local equipment was not in good operating condition. In addition, a critical military shortage of gasoline added difficulties to reconnaissance, procurement, and delivery of materials. At one point, the steel of a demolished bridge had to be cleared from the channel.

The shore sections of the new bridge, except for two framed bents, were pile bents. The gravel bottom insured a good foundation, but pile-driving with the ½-yd. shovel attachment was agonizingly slow.

Orientation of barges a problem

One of the major decisions concerned the placing of the barges—whether they should be parallel to the shore or in pairs perpendicular to it. The former method used less bridging materials and took less time, the latter used fewer barges.

Both methods were employed—bridging out from the south shore with barges used as pontoons framing four barges independently for use in the same manner, and, also framing a pair of barges for use transversely across the stream.

A shovel with driver attachment drove piles on each bank. An additional shovel, similarly equipped, worked from a barge.

Numerous problems were solved with typical engineer ingenuity. For example, when spans were to be provided between the pile bents and the barges, steel beams were used in the same manner as the balk for the hinge span of a standard pontoon bridge, but a special connection had to be made between the lateral and longitudinal barges. Fig. 3 gives a layout and interesting detail sections and Fig. 2 is a photograph of the bridge under construction.

Seine bridged in five days

On the evening of the fifth day, the mayors of Fontainebleau and Fontaine le Port were driven across the bridge. Both had assisted materially in the procurement of materials and had shown great interest in the construction. Each stated that he had considered bringing a quantity of cognac or champagne to the site, but was fearful of delaying construction. *C'est la guerre!* Additional decking, guard rails, etc., were added, and the bridge completed on the sixth day.

Meanwhile, at Montereau, E Company, commanded by Capt. Earl V. Truex, struggled to construct the second bridge. Conditions were quite similar at this site to those at Fontainebleau. All priority on men, equipment and materials was given to the Fontainebleau job. Capt. Truex cut his piles from standing timber, logged much of his other lumber, and scoured the country in all directions for materials. Four suitable barges were located, framed in pairs, and placed with their long dimensions across the stream between pile bents. The construction time of ten days was the minimum under the existing conditions, and workmanship was first-class throughout.

Although definitely wartime expe-

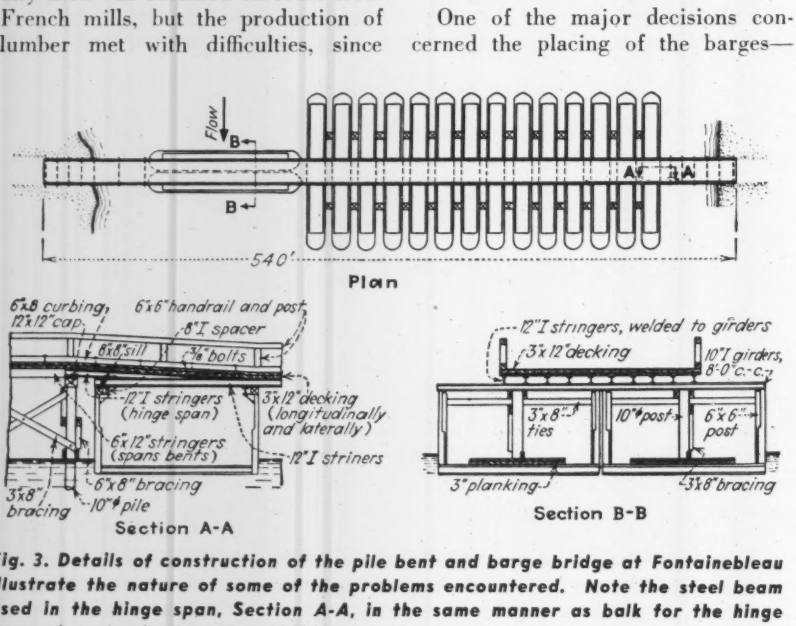


Fig. 3. Details of construction of the pile bent and barge bridge at Fontainebleau illustrate the nature of some of the problems encountered. Note the steel beam used in the hinge span, Section A-A, in the same manner as balk for the hinge span of a standard pontoon bridge.

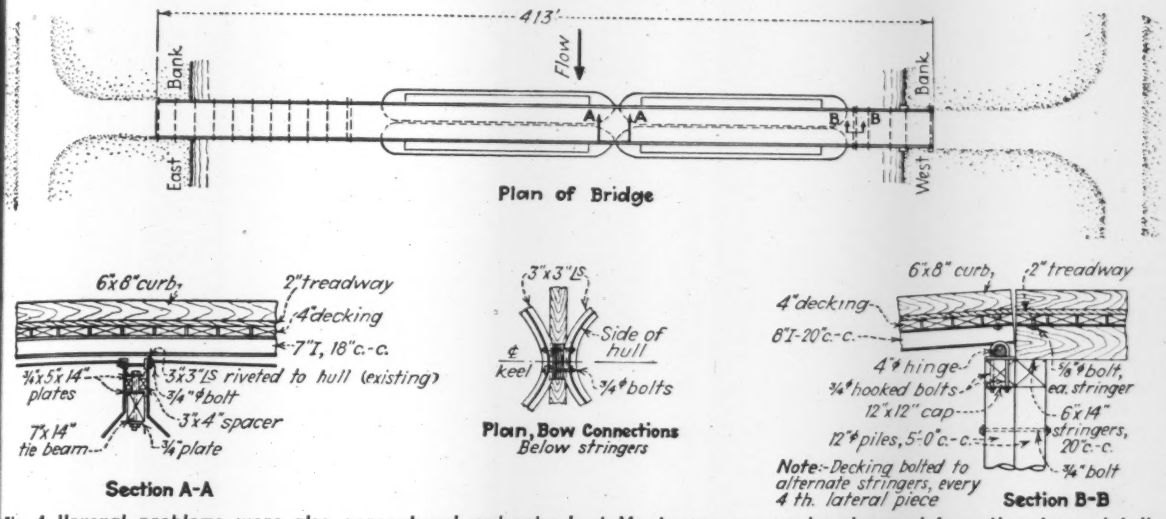


Fig. 4. Unusual problems were also encountered and solved at Montereau, as can be observed from the above details.

dients, these bridges are successfully carrying the heavy traffic of a fast-moving modern army.

The successful construction of these two major structures by a unit without special training for the task is a tribute to the energy, intelligence, and persistence of the average American—the man Hitler can't understand.

Faulty Bid Data Basis of Court Award

Samuel I. Sacks
Sacks & Piwosky, Attorneys, Philadelphia, Pa.

The doctrine that information available on subsurface conditions must be given as fully and as accurately as it is known was confirmed recently by the Pennsylvania Supreme Court (350 Pa. 355) in affirming a judgment for about $150,000 in favor of York Engineering & Construction Co. for work done on the Pennsylvania Turnpike. The court, refused, however, to allow interest for four years time elapsed since the expense was incurred.

The contract contained the usual provision that each bidder shall familiarize himself with all documents and with the site and conditions of the work. Quantities were stated to be approximate only and, according to the documents, were given merely as a basis of calculation for selection of the lowest bidder. The contract contained the familiar self-exonerating clauses —"The Commission does not assume any responsibility that the quantities shall obtain strictly in the construction of the project nor shall the contractor plead misunderstanding or deception because of such estimates of quantities or of the character of the work . . ." Wherever subsurface materials information is indicated (on the drawings) it is understood that it was obtained in the usual manner and with reasonable care, and the location, depths and character of the material have been recorded in good faith. There is no expressed or implied agreement that the depths or the character of the material has been correctly indicated and bidders should take into account the possibility that conditions affecting the cost or quantities of the work to be done may differ from those indicated."

Only eleven days was allowed for preparation of proposals from advertisement of the project until the date fixed for return of bids, yet the job was of such magnitude that four to eight weeks would have been required for a complete subsurface investigation. Thus, the bidders were compelled to rely on the plans as to subsurface conditions. Plans indicated that the work was predominantly in loose earth but, according to the court, "engineers for the Turnpike Commission had investigated the subsurface conditions of the section and found it to be predominantly rock . . ."

Under the contract, matters in dispute were referred to a board of arbitrators. There was agreement on the quantities actually moved but there was a dispute pertaining to the question of the subsurface material, the contractor claiming it was misrepresented on the plans. The arbitrators found the plans furnished by the Turnpike Commission misrepresented the character of the subsurface material to an extent that it amounted to a breach of contract and awarded the appellee $149.870 with interest at 6 percent from June, 1940. A lower court upheld the award but disallowed the interest.

In upholding the arbitrators and the lower court on the award, the Pennsylvania Supreme Court said, "This court having recognized with approval, the right to a recovery in this type of case, where the misrepresentation was substantial and not a mere inaccuracy or innocent mistake, it would seem clear that the Turnpike Commission worked a substantial constructive fraud upon the contractor in the inaccurate information furnished in this case and on which the contractor had, under the circumstances, a right to rely, and did rely." Quoting from a noted legal authority the court said, "fraud in the inception of the agreement renders voidable the very agreement not to set up fraud, and, aside from this technical but sound argument, such an agreement would obviously be against public policy."

Submarine Drilling with Job-Assembled Rig

N. A. Bowers
Pacific Coast Editor, Engineering News-Record

***Contents in Brief**—Seabee ingenuity devised and adapted available construction equipment for service as a seagoing barge from which to drill and blast a channel through a coral reef two mile offshore. Methods and equipment were developed as the work progressed until each shift put down and blasted 24 to 30 holes of 6-in. dia. in hard coral and up to 80 holes in soft coral. Subaqueous removal of 22,000 cu.yd. of coral rock from a 300x600-ft. area was required.*

ONE of our important ports in the Solomon Islands is protected from the open sea by a coral reef, which is nearly all submerged but has no natural openings sufficiently wide and deep for seagoing vessels. Through that reef there is now an adequate channel, built by hard-working Seabee battalions who did the job with such equipment as there was at hand —put together and made to serve the purpose in a highly effective manner. In making the channel and entirely incidental to the job, they developed a technique that will doubtless be useful elsewhere in punching holes in coral reefs.

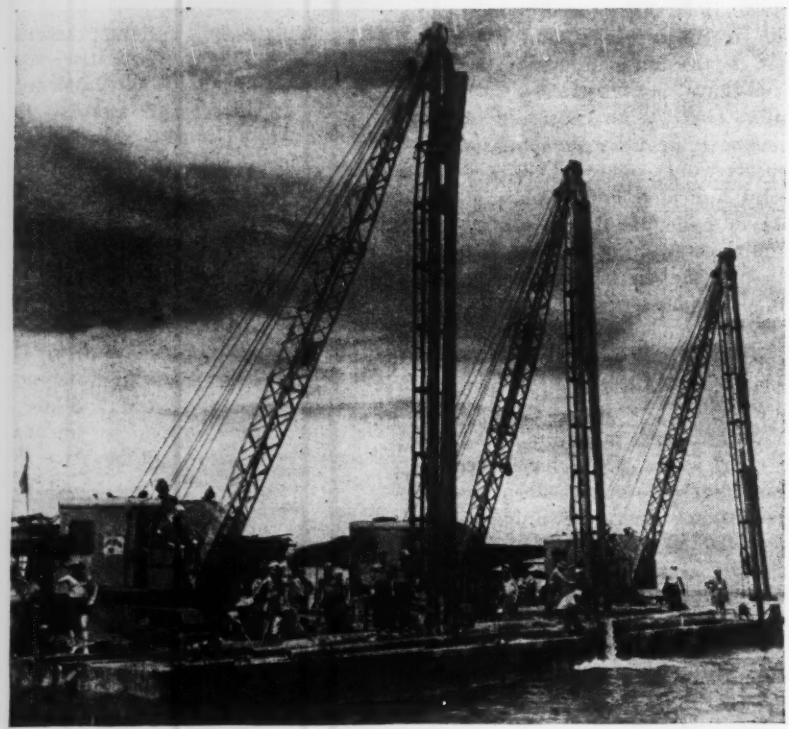


Fig. 1. From this pontoon-cell barge holes were punched in the coral by spuds made of pipe, pounded down by pile-driver hammers. Left rig is moving to new position. Center rig is removing core from spud. Right rig is driving spud.

Essentially, the work involved the removal of some 22,000 cu. yd. of soft and hard coral from water depths of 10 to 18 ft. in an area 300 ft. wide by 600 ft. long. The principal unknown element at the start of the job was how to make the best time in putting down holes in the coral in which to place the blasting charges.

A drill barge 43 ft. wide by 103½ ft. long was made up of the standard Navy pontoon cells—a standard 6x13 barge—propelled by two inboard power units (*ENR* April 20, 1944 vol. p. 540). Three 10-ton cranes, with 35-ft. swinging piledriver leads hung from 40-ft. booms, were mounted on the barge and lashed to the deck in positions that permitted driving along the entire length of one side of the barge.

The barge equipment included two 315-cmf. compressors, a 7½-kw. generator for lighting, a 300-amp. electric welding machine, an acetylene generator to operate welding and burning outfits, a first-aid room and a galley. Diesel fuel was stored in one of the pontoon cells and water storage was provided by a 500-gal. wood stave pipe mounted above the deck. Two winches, at either end of the barge near the center line, each with drum capacity for 400 ft. of ⅝-in. wire rope, operated mooring lines which were led through steel blocks at the barge corners en route to anchors.

The barge was operated by a crew

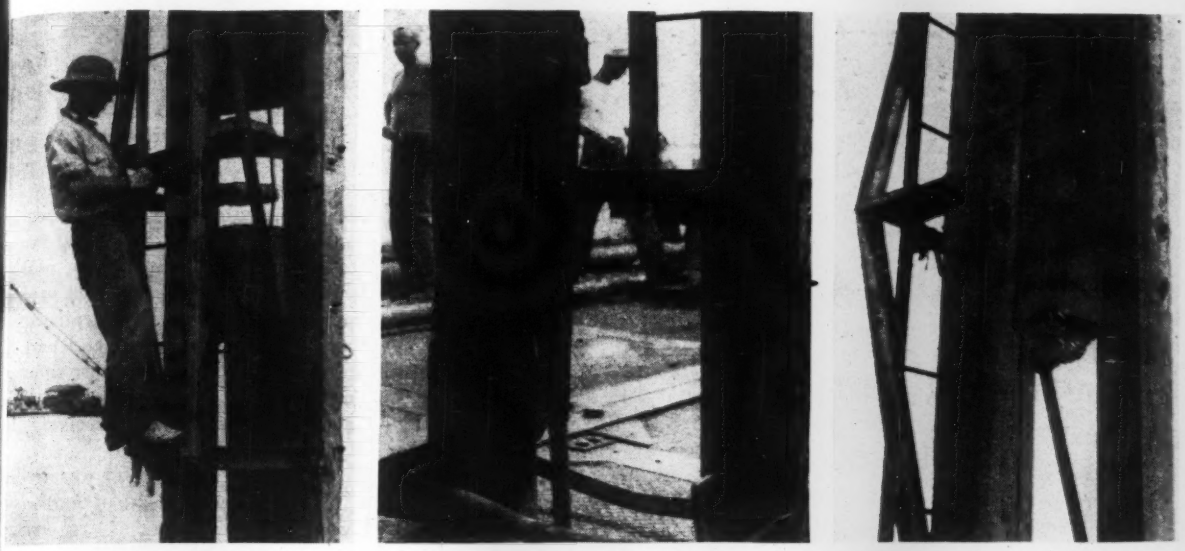


Fig. 2. Between hammer and hardwood head-block a cushion or mat made of compacted cardboard is used. Center: This special spud point starts holes in extra hard coal where ordinary spud would not penetrate. Right: Lower end of 6-in. pipe spud after being raised from hole. Note tip of coral core projecting.

of 40 men under direction of a chief petty officer. The bulk of this crew consisted of five men on each of the three piledrivers, eight divers, six diver tenders and three powder men. Work was carried on in two shifts with two complete crews quartered on shore and taken to and from the barge daily by boat.

Anchoring the drill barge

The first job for the barge was to lay the necessary anchors. This matter of anchorage was a serious problem because the site of the work was in an exposed location where waves as high as 8 ft. could come up suddenly, breaking over the barge and making it necessary to stop work and move to an anchorage in the lee of a nearby island. Sometimes during the monsoon season the waves were too severe for work during periods of two to three weeks at a time.

Even when there were no storms the anchorage requirements were not to be neglected. The three driver leads and their gear called for a barge whose total weight was about 300 tons. The only available cables for anchor lines were $\frac{5}{8}$-in. wire rope, used on drums of small hoisting engines intended for $\frac{1}{2}$-in. rope. Neither cables nor winches were heavy enough. Anchors of the 1,500-lb. type were used at the start but due to heavy wave action the cumbersome barge frequently shifted the anchors or snapped the cables and slowed up the work. It soon became apparent that better anchors, preferably dolphins, were required.

Accordingly it was decided to install four dolphins, two on a line parallel to and 40 ft. distant from each side of the channel. It later appeared that a location 100 to 150 ft. from the channel and the use of a greater number of dolphins would have been better.

The five piles in each dolphin were put down in holes started by blasting or by steel spuds. The piles were shod with solid steel points and driving rings. A 3,000-lb. hammer with a follower was used and 8 to 10 ft. of penetration was secured without shattering. When the dolphins were in place six turns of anchor chain were loosely wrapped around each dolphin and passed through a ring at the coral line. Some 30 ft. of 1-in wire rope connected this ring to a second ring to which mooring lines could be shackled and to which a short pickup line and buoy was attached. A platform for a transit was built on top of each dolphin.

The barge had been equipped with piledrivers in the belief that with them it would be possible to punch down spuds of some sort into the coral to make the holes needed for blasting charges. If this method worked it would doubtless be the quickest and simplest means available. Not much was known about the reef material but it was said to be coral "compressed and petrified into solid white limestone rock." The program was to try out spuds made of pipe, varying the design as experience dictated. The hammers that would fit the available leads weighed only 1,300 lb.

Easy going in soft coral

The work was started in relatively soft coral and a 2-in. pipe was used to punch the holes. At the lower end of the pipe a solid metal tip or point somewhat larger than the pipe was lightly fastened in place. After driving the pipe to a level 23 ft. below mean low water, a penetration of 8 to 10 ft. below bottom, the pipe was withdrawn, losing only the metal tip in the hole. About 80 of these holes of small diameter could be put down and loaded in an 8-hr. shift. Half of a 50-lb case of 60-percent dynamite was a sufficient charge in them to break out the rock.

Then the coral formation changed. Instead of eighty 2-in holes per 8 hr., the schedule was adapted to 24 or 30 holes 6 in. in dia. in a 6-hr. shift. The larger diameter made it possible to load each hole with two to three cases of dynamite.

This plan called for use of 6-in. open pipe spuds and permitted removal of a core rather than requiring compressing the coral to make the hole. An important factor in the method developed was use of a 30-in. length of 10-in. pipe set temporarily, like a collar, at the top of each hole

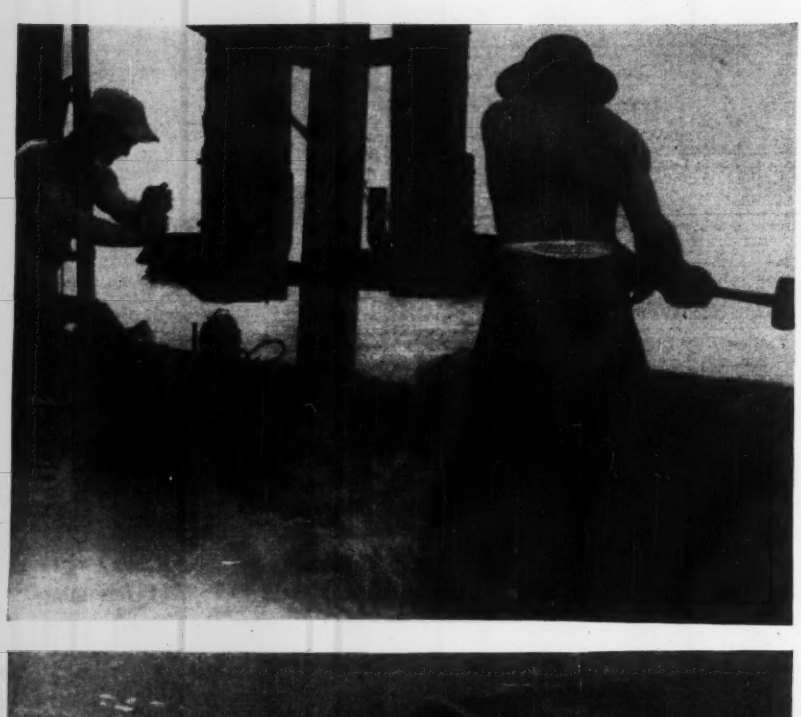


Fig. 3. After spud is lifted from the hole (at top) it is tapped to remove the core. Below: Reinforcing ring welded inside the spud point is shown by cutting away a portion of the end of the 6-in. spud.

to prevent caving in while loading with explosives. The 10-in. pipe was driven at the start of each hole by inserting a bar through the pipe near the top and driving on it with the 6-in. pipe. When the pipe was driven to the desired depth, the bar was withdrawn by a diver and the 6-in. spud then went on down inside the collar.

Spuds with which to put down the larger holes for the heavier charges were made up of 6-in. standard-weight pipe, though heavy weight pipe would have been used had it been available. At the lower end of each spud a 4-in. wide ring was welded inside the pipe. This fulfilled three functions: it provided thicker metal for shaping into a chisel edge, helped retain the coral core while the spud was being removed from the hole and made the core of smaller diameter than the pipe, thus preventing clogging. The cutting edge was well covered with stellite hardening rod.

Core splitter saves time

An improvement on the continuous pipe walls was the use of two 4x6-in. openings cut in the spud, on opposite sides, about 16 ft. above the bottom for escape of air and water. These openings were reinforced with angles welded along the outer edges. Just above each opening a "core splitter" was welded inside the pipe to prevent the core from extending into the spud beyond this level. This splitter scheme avoided necessity of bringing the pipe to the barge deck for the sole purpose of removing a section of core.

Because of the scarcity of 6-in. pipe it was decided to make use of two pipe spuds more than 16 ft. long. Any additional length required was made up by a hardwood follower. Hardwood was plentiful in forests on nearby islands and followers were cut in sizes and length required. Each pipe spud had welded to its upper end part of an old oxygen cylinder whose squared end had been cut away, leaving a receptacle convenient for receiving the lower end of the follower.

Even where no follower was needed a plug or driving head of hardwood was used, projecting a few inches above the top of the steel. Although wood is ordinarily a sufficient shock absorber, the solid mahogany of this region was so very hard that it was found advisable to cushion the hammer blows with a pad made by compacting the cardboard of cartons in which supplies had been shipped. Compaction was readily provided by the driver hammer.

In a routine hole-driving operation a hammer on each of the three rigs drove the 6-in. spuds 12 to 15 ft. into the coral to form holes 10 to 12 ft. apart. After each 2 ft. of driving the spuds were picked up a few inches to prevent binding. After reaching grade the spuds were pulled, bringing with them most of the coral core. The core was removed by tapping with sledges or by dropping the spud on a steel bar welded to the deck. In the harder coral formations only 3 to 4 ft. could be penetrated, thus requiring closer spacing of holes or shooting in two stages, depending upon the material.

As a row of holes was completed the barge was moved back 10 to 12 ft. and the process was repeated. This was continued until as many holes had been put down as could be loaded and shot before the end of the shift. After the work was well organized, four rows of holes were drilled and fired in an 8-hr. shift or three rows in a 6-hr. shift, when the weather was fair. Progress was also affected greatly by the varying hardness of the formation.

When the 6-in. holes had been made to a sufficient depth (the average was 10 ft.), divers went overside to clean them out and to place the dynamite charges. A water jet was more effec-

ive than compressed air in getting he holes clear. Meantime, on the arge deck covers were removed from he 50-lb. cases of dynamite and the contents secured by a wooden strip ightly tacked across the top. The ases were then tossed overboard to ink near each hole.

Six divers working simultaneously illed the holes, using two to three ases of explosives per hole. When oles were loaded two divers, working rom the ends toward the middle, laced live charges on top of the dyamite in each hole. These charges consisted of one primed stick lashed o two unprimed. Leads of No. 6 primer were cut short and spliced o rubber-covered communication ire long enough to reach from the ole to the barge deck. Meanwhile, he barge was moved back a distance of 500 ft. to be clear of the blast effect.

Dredging done by clamshell

After blasting, dredging was done by a 25-ton crawler crane mounted near the bow of a barge and equipped with a 1½-cu. yd. clamshell bucket. About 1,000 lb. of ballast added to the clamshell bucket materially improved its operation under water. A drag-line bucket was tried but was not successful. The bottom was extremely rough after blasting, and material ranged from dust to fragments of 12-in. size and larger. The drag bucket did not move smoothly thus causing the barge from which it was operated to surge back and forth. This action, added to the swells, made it difficult to hold the spoil barge alongside.

The clamshell, on the other hand, worked fairly well from the start. As operators learned to anticipate action of the ever-present ground swells, production was increased to 350 to 400 cu.yd. per 12-hr. day. The only regret was that a larger bucket was not available.

Spoil barges unloaded by bulldozer

The dredge removed all blasted material regardless of depth, as the work progressed, charting the spots insufficiently blasted. Spoil was loaded on two 4x12 pontoon-cell barges, each with a single outboard propulsion unit and covered with 2-in. timber planking to protect the deck. A 70-hp. tractor with bulldozer was used to unload the spoil, with the blade set 2 in. above the deck. With this tractor the 90- to 110-ton load, as determined by displacement, was pushed off the barge about ¼ mile from the channel.

In rough weather it was necessary to ground the barge against an island one-half mile from the channel for the unloading operation. An island was ultimately formed at the closer site of disposal and this served for all dumping during the latter half of the job.

After blasting operations were completed on the outboard half of the channel the drill barge moved to the inboard end and worked back toward the center. This made way for the dredge, which successively worked over the areas already drilled and blasted. After the dredge had worked over an area the drill barge made a second trip over it to blast out the high spots. The dredge also made a second trip to clean up the reblasted areas and to mark any high spots still remaining. Such of these as were found were surface-blasted by divers working from a small auxiliary barge.

Finally, a drag was rigged on one of the spoil barges for a final check on depth and to remove any loose material remaining above grade. This drag was made up by welding 8x8x⅝-in. angles about 35 ft. long into a box-shaped girder. Two such girders or beams were connected by channels with a 10-in. opening between them and 500 lb. of ballast was added. This drag was suspended beneath the transverse axis of the barge by wire rope attached to winches. A wire rope also led from each end of the drag to the bow. Material too hard for removal in a few passes with this rig was charted and surface-blasted.

Radio equipment borrowed from the Signal Corps proved invaluable. One set was maintained on shore, one on the drill barge and one on the dredge. In addition, three short range walkie-talkies were used by the sounding and survey crew around the channel area.

The work was done by several battalions under the direction of Comdr. P. M. Jeffords, Orangeburg, S. C., regimental officer in charge. Comdr. K. P. Doane, New York City, worked out the plan of operation for the dredging program. In charge of crews at the time the work was visited by the author were Lieut. Hugh Mehler, of Dallas, Tex., annd Lieut. Thos. C. Borland, Oil City, Pa.

Seabees Complete Difficult Underwater Electric Welding Job

Meeting strenuous working conditions is no novelty for Seabees and when an underwater electric welding job had to be done in New Caledonia, in almost no time a crew of youngsters was organized for the project. This particular job, carried on from a barge on which the necessary electrical equipment had been mounted, was on a ship that had been torpedoed; work had to be done in warm ocean water at shallow depth. The "divers' suits" consisted of gas masks to which air supply lines had been fitted: no waterproof suits and no heavy armor or weights were used. More like a pearl diver, each young swimmer put on his mask, picked up the tools of the trade and dived overboard.

These tools consisted of a ⅜-in. dia. welding rod, without flux, inserted in an 18-in. length of galvanized tube that was used as a handle for the "stinger" or hot lead from a source of welding current. The usual working amperage was 400, supplied at about 60 volts. The voltage ranged from 40 to 80, the higher figure being delivered when striking the arc. The galvanized tube was covered with electricians' tape to decrease the leakage of current to the body of the welder.

Despite this concession to the sentiment favoring at least some minor safeguards, salt water is such a good conductor of current that the welders got shocks aplenty. In fact, the foreman of this particular welding crew met difficulty in the tendency for sparks to snap between a welder's gums and metal fillings in his teeth. Rather than try to find some protection against this trouble, the foreman, when interviewed, was trying to make up his crew exclusively of boys with sound teeth or with only porcelain fillings.

Emulsified Asphalt on Wet Coral

***Contents in Brief**—This is a record of experience in constructing "Bomber Three," an airstrip on a Pacific island where heavy forest cover and deep overburden were only preliminaries to the real problem of making a satisfactory paving with coral and asphalt emulsion. The emulsion had to be used in varying dilutions to offset the effect of precipitation, usually heavy and frequently changing.*

"Bomber Three," an airstrip built by Seabees in the South Pacific, for a long time was a headache to successive battalion commanders and even to higher officers who made inspection trips during construction. But it afforded valuable experience in working under adverse conditions, such as continuous rains and lack of materials of the quality desired. Of particular interest is the experience in applying emulsified asphalt, which happened to be available on this job. It more often was not available on the islands of the Pacific, where airstrips had to be surfaced.

High site picked

Bomber Three became an outstanding project when, in the absence of a more desirable site, it was decided to depart from the usual practice of using a location at low level close to the beach and to locate this airstrip at an elevation of some 300 ft. above sea level. The site was covered with some of the heaviest jungle growth encountered by our forces. Moreover, this location involved uncertainties about topography and overburden, both of which could be only roughly appraised in such investigations as it was possible to make in advance. Extremely dense jungle growth (1) reduced the practical value of aerial photographs in the matter of exact surface topography and (2) limited the amount of surface exploration that could be done on foot.

Clearing and grading

Nevertheless, final location was made and clearing operations began for a runway of sufficient length to accommodate our heavy bombers. The width of the surface runway is 150 ft. and there are 75-ft. shoulders on each side. This gives a width of 300 ft. between tall, deep-rooted trees, mostly varieties of hardwood.

The clearing operation, a major project on its own account, was done with bulldozers and power equipment, and this modern equipment made clearing largely a routine matter despite the fact that mahogany logs were larger and heavier than anything previously moved on similar work.

Grading operations involved first the excavation and disposal of great quantities of overburden, then the replacement of the soft humus underlying the jungle growth with finger coral, and whatever other cleanly washed material that could be found along the shore line or borrowed from nearby coral pits.

As the material was deposited for building up the subgrade to the required level, rolling was continued day and night for three weeks with a dozen rollers, ranging from five to eight tons in weight. It was realized that because of the heavy precipitation drainage problems would be serious at best and that a well-compacted subgrade was an absolute necessity. As an aid in handling drainage water the subgrade was given a crown of 1 ft. at the center of the 300-ft. width.

Surfacing material studied

When subgrade compaction had reached the stage where a "gloss finish" was obtained, construction crews began what proved to be a three-months experimental study to determine what type of surfacing could be built satisfactorily with materials at hand.

The coral that was available in the desired quantities did not have the bonding quality that could be relied upon to provide a firm and impervious surfacing. However, asphalt emulsion of two types was available in quantities sufficient for the area to be paved and it was decided to use this as a binder for the coral. The emulsion was in 50-gal. drums. That classified as "primer," according to the drum markings, did not respond well in tests and practically all of the work was done with the other grade, marked "asphalt emulsion stabilizer."

Records on this material showed that it contained twelve parts of water to one part of asphalt. Before application, this 12:1 ratio was thinned out by a further 15:1 dilution.

Mix varied with weather

This ratio had to be varied with the weather. In extremely wet weather the mix was made richer and in dry weather more dilution was used, proportioned according to the judgment of the officer in charge. This preliminary coating was put on the finished subgrade in five successive applications. Each was allowed a week or ten days to dry out and evaporate, more in rainy weather.

Preparation for the next layer of material was made by selecting the best quality of coral available and hand picking the hardest fragments which were fed into a crusher with jaws set for 1 in. Crusher run was spread over the subgrade in strips 8 ft. wide and 1 in. deep. Two men worked over these strips, tossing out all oversize fragments.

Following this operation a series of emulsified asphalt coatings were applied, using a much richer mix than was put on the subgrade. The first two applications consisted of 75 percent water and 25 percent stabilizer as taken from the drum, *i. e.*, the 12:1 emulsion. When rain occured while applying the emulsion, a compensation was made by reducing the amount of added water. On the rare occasions when no rain fell for a few days it was found desirable to use a sprinkler truck for wetting down the surface prior to the asphalt application, limited to $\frac{1}{2}$ gal. per sq.yd.

This picture, taken at another airfield job, shows one of the many ingenious ways in which the Seabees use Marston mats. The mats were welded on the sides of the truck bodies to increase their capacity to carry light weight coral rock.

When the emulsion had dried out somewhat in the 1-in. layer of select quality coral, this layer was bladed up into windrows and then re-spread as evenly as possible, after which there were three more applications of the same mixture.

The surface finish

Then began the endeavor to roll the surface, which was perhaps the most difficult job of all. Because of the combination of conditions, particularly the heavy rain, no way could be found to prevent accumulation of waves ahead of the roller as soon as it had traveled any considerable distance. Finally, the idea of longitudinal rolling was abandoned altogether and the rollers were worked at right angles to the center line, that is, moving from shoulder up over the crown and back. For this operation three-wheeled rollers were found impracticable because of the overlap in the area covered by forward and rear rollers. In other words, there was such a narrow margin in stability of the top-dressing material that it was necessary to use tandem rollers with both wheels of the same width in order to get an absolutely even distribution of pressure. These rollers, weighing 5 tons, made only one pass.

After this "extremely ticklish operation" of rolling which dragged out over several weeks, another application of the emulsion, diluted by the addition of fifteen parts of water was made to finish off some minor cracking of the surface. When this had dried a final application of the same dilution was put on as a finishing touch. It was the opinion of the officers in charge that maintenance of the surface calls for a similar application (that is, a 15:1 dilution of the drum emulsion) applied at intervals of one month using standard spray nozzles moving at 10 m.p.h. During the rainy season cutback asphalt might be preferrable to the emulsion.

Conclusions and observations

In summarizing the difficulties and experience in getting the surface of Bomber Three in shape for use of airplanes, officers in charge agreed that no exact standards of mix or application procedure could be set up in advance where there are sure to be such wide variations (1) in materials used, particularly as to the absorption coefficient of the coral and (2) in the precipitation or lack of it due to sudden weather changes. However, by careful attention to variations in dilution of the emulsion and to methods of application, it was believed that an adequate and serviceable surfacing could be secured. As proof of the quality of paving finally secured on Bomber Three it is said that where rough treatment has scarred the surface, as from the impact of tail skids or bomber landings, it is more frequently the coral and not the binder that is broken.

In a "post-mortem" discussion held some months after completion of Bomber Three and at a time when it appeared probable that this airstrip never would be used as a base for heavy bombing operations, three conclusions were offered, namely: (1) rounded grains do not compact readily; they tend to roll. Where this occurs a crushed product may be required to provide compaction suitable for a paved surface; (2) the theory held by some authorities that any and all coral can be used in runway surfacing should be qualified by the proviso that in some cases crushing is necessary and in still other cases some stabilizing binder may be desirable. Finally, (3) in the absence of a test under heavy-duty service it has not been proved that an airstrip paved as was Bomber Three will give entirely satisfactory service under heavy bomber operations. Certainly after damage by bombings and crash landings it could be repaired more easily than could a surfacing of Marston mat.

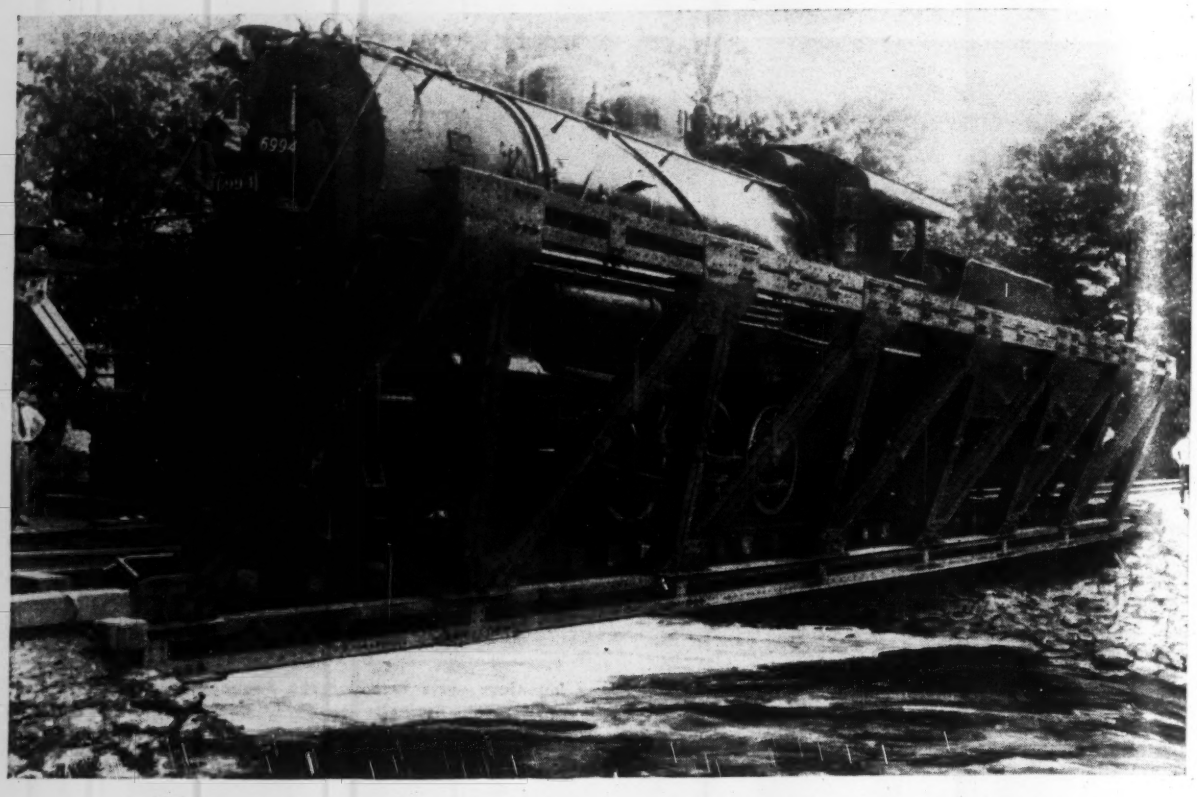


Fig. 1. Of singular design, yet sturdily constructed, this V-type bridge carries medium-heavy railway equipment.

Demountable V-Type Railway Bridge

T. Janiszewski
Engineer, Fort Pitt Bridge Works
Pittsburgh, Pa.

***Contents in Brief**—Developed primarily for the replacement of demolished railroad bridges at the battlefront, the Fort Pitt Bridge Works demountable V-type bridge can be erected either as a deck or a through structure of 40 to 90-ft. span for railroad equipment and of 240-ft. span for highway usage. When erected as a deck truss, it contains two top chords but only one bottom chord.*

REASONS of military security have made it necessary to withhold information on several new types of bridges developed solely for combat duty. Under this security blackout American bridge designers have devised various types of these structures, some revolutionary in concept but all planned to produce a military bridge.

In general, military bridges differ from civilian bridges in that they can be fabricated by mass production methods, need a minimum of shipping space and require as little material as necessary to safely carry their design loads over various spans. In addition they can be quickly and easily assembled on the battlefront by combat crews having little or no experience in bridge construction.

The Demountable V-Type Bridge, developed by the author and built by the Fort Pitt Bridge Works, Pittsburgh, Pa., fully satisfies these requirements and has been recommended as Army equipment by the Engineer Board, Fort Belvoir, Va. Primarily, this V-type demountable bridge is designed for speedy and easy replacement of demolished railway bridges of 40 to 90-ft. clear span. It can be erected either as a deck or a through-type single track span, square ended or skewed. It is designed for Cooper's E-40 railway loading.

Erection of two deck truss spans side by side, bolted together, produces a two-lane highway bridge capable of carrying 20-ton trucks (H-20 loading) for a maximum clear span of 180 ft. For light traffic this two-lane span can be extended to 240 ft. Deflection, rather than design stress, governs loading in long highway spans.

In constrast to many other types of combat equipment now being used

on the battlefronts, the development of this V-type bridge has extended over the past several years. The first design was made in 1927 based on observations made by the author during the first World War in connection with the difficulties encountered in restoring demolished railroad bridges, especially in armored train operation. Even then the lack of a handy small replacement structure was obvious.

Then, too, it was apparent that an acceptable combat bridge must have certain characteristics such as: (1) fabrication from common material easy to replace, (2) contain simple parts and connections, (3) possess members sufficiently rugged to resist destruction by improper handling, (4) handle easily and afford quick erection, and (5) although it must be designed strong enough to carry heavy railroad loads it should be light in weight and adaptable to any reasonable span.

New and old designs compared

With these requirements in mind, which sometimes are contrary to each other, the original design was similar, basically, to the present deck bridge, except that truss members had a starred cross section instead of the present box section. In addition, truss joints were heavy steel castings weighing twice as much as the present bent plate assembly. Moreover, upper truss chords were subjected to considerable bending since they served as stringers to carry the ties and rails. The entire bridge contained only one type of joint, one type of angle and one type of plate.

Fort Pitt Bridge Works became interested and decided to build a V-type railway bridge as an experimental structure. Following Pearl Harbor this company, at its own risk, built and shipped the bridge to the Engineer Board for testing. During these tests, there arose for the first time the question of converting a 70-ft. deck structure into a through bridge. This new requirement met with the utmost success. Initial dynamic tests on the bridge fully confirmed the designer's contentions as to the stability of this unusual design. Intensive tests conducted during the summer of 1942 proved the bridge's adaptability as a railroad combat structure and it was approved by the Engineer Board as United States Army equipment.

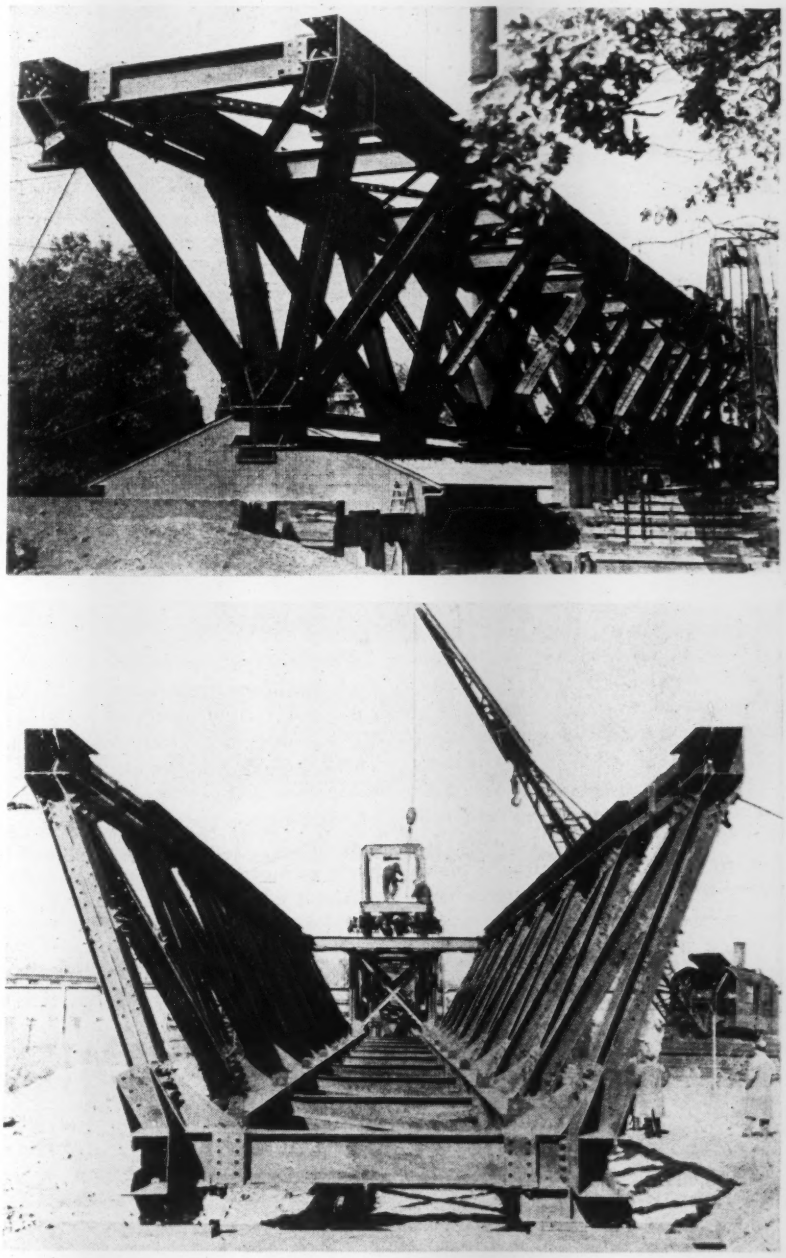


Fig. 2. Cantilever erection of deck truss spans (at top) and through trusses (at bottom) is performed quickly by specially designed railway-mounted equipment.

Reduction in the number of different parts and in the weight of steel is held to be of paramount importance in military bridges. To secure this, the deck bridge contains only one bottom chord, and the two top chords are flared out on a slope of 1 on 2 to form a triangular cross section resembling a V. The use of the triangular cross section entirely eliminates wind bracing in the lower chord.

Moreover, the main trusses, which are 9 ft. 6 in. deep, contain only two elements: the joint and the angle. Through the proper combination of these two elements any desired bridge member can be built. The number and spacing of holes in all angles forming the chords, web diagonals and wind bracing are identical. A standard 10-ft. panel length was adopted to meet the different possible span lengths. Shorter angles, however, are provided for the end panels

for spans that are skewed or are not even multiples of 10 ft.

In deck structures the floor system is bolted between the top chords and takes the transverse wind stresses. For through bridges the trusses are spread sufficiently to permit bolting of the same floor system to the two half-sections of bottom chord. In this case the upper chords have no wind bracing but they maintain the same degree of flare as in the deck structures, producing a compact structure with sufficient horizontal clearance for the passage of railway traffic.

Floor system resists wind

Bending moments in chord members are avoided by providing a separate system of floorbeams and stringers to carry the railroad track or highway roadway. The same floor system is employed for either type, whether assembled as a deck or through structure. It is made up of wide - flanged, rolled floorbeams spaced 10 ft. apart with their ends reinforced to take the heavy shear reactions of locomotive loading. Two longitudinal lines of rolled-beam stringers, bolted between the floor beams, carry the track ties and railroad rails, or timber flooring for highway bridges. Lateral plates welded to the webs of stringers connect with angle cross-bracing to resist wind. In the through trusses small bracket connections also are placed between the floor-beams and the flared truss members to eliminate tension in the bolted end connections of the floorbeams.

Many advantages are to be found in this bold design for a demountable railroad bridge, chief among which is its simplicity and the ease with which it can be erected. Also, it affords a substantial saving in weight, a typical 70-ft. span containing only 750 lb. of steel per foot of bridge. Its total weight ranges from 45 to 70 per cent less than similar railroad bridges (depending on span length) having the same load capacity. This not only reflects in a reduction in shipping space required for its transportation, but also facilitates the problem of spare parts and erection.

Fabrication is simplified

Simplicity of fabrication and erection has been incorporated in the trusses by using standard members, all of which are interchangeable. These members are made of regular bridge steel, of common sections and of dimensions permitting easy replacement. Field connections are made with ordinary commercial bolts.

About 65 percent of this demountable V-type bridge consists of parts so simple they can be fabricated, if necessary, in any field shop in any country. Through standardization of design and fabrication, the number of main parts of the bridge has been reduced to four, none of which weighs more than 400 lbs., yet each is sufficiently rugged to withstand rough and careless handling. The main parts are: (1) the joint, (2) the standard angle, (3) the floorbeam and (4) the stringer. Very few secondary spare parts (spare bolts and tie plates) and virtually no skilled labor or special equipment are needed for its erection.

Patented truss joint

One of the most outstanding features of the bridge is its patented truss joint. Made up of specially cut and bent plates, it is welded together to form a single unit but all welds are arranged so that none are subjected alone to tension in the line of stress. In general, the welding merely stiffens the joint and aids in its assembly.

These joints produce a damping effect on the trusses as a whole, which keeps impact stress down to 18 percent for a 70-ft. span carrying a 45-m.p.h. moving live load corresponding to Cooper's E-40 loading. Live load deflections under this impact, because of the favorable proportions of the bridge, is less than 1/1,000 of the span length. Due to the unique position and great lateral rigidity of the side trusses, the stiffness of the floorbeam connection is adequate to secure perfect stability of the through trusses.

Extensive strain gage tests were made on the bridge under actual loading conditions. From these results it was possible to determine more accurately the effect of secondary stresses and to arrive at a more accurate selection of the factor of safety. Primarily, the truss was designed for a basic unit stress of 21,000 psi. but by taking into account the effect of fatigue, impact, secondary stresses and other factors it was possible to increase unit stresses to 27,000 psi. without danger of exceeding the elastic limit of the structural steel.

Fabrication of the demountable V-type railroad bridge is simplified by the small number of parts required. About 55 percent of the material needs only punching and

Fig. 3. Deck trusses are adaptable to a wide variety of field conditions. Extra punching in truss members make all parts interchangeable.

shearing to size from plates and angles. Field bolts constitute 10 percent of the weight. Truss joints, which contain 22 percent of the weight of the bridge, are the most elaborate due to their requirements for exchangeability. They are welded on jigs to insure correct disposition of holes. Floorbeams and stringers receive similar treatment.

Erected by two methods

Erection of this demountable bridge can be accomplished by two methods: (1) by bolting it in place on light falsework or (2) by cantilevering a preassembled structure out from one abutment. No special erection equipment or skilled labor is required in the first method and its simple assembly permits the structure to be bolted simultaneously at each joint thus speeding its erection. This method is the most recommended for regular use. Foreseen for special war conditions, the second method of erection is made possible through the bridge's relatively light weight. In this case a special launching device, operating on the approach railroad track, cantilevers the previously assembled span out over the near abutment. Not more than two hours are required to launch a 90 ft. single span by this method, following its preassembly on the river bank.

Postwar possibilities for the demountable V-type railway bridge visualizes its usage in foreign lands for the speedy restoration of railway communication, thereby paving the way for increased international trade. In this country it may fill a useful purpose in replacing structures washed out by floods, or it may be used as a temporary structure during the erection of permanent bridges.

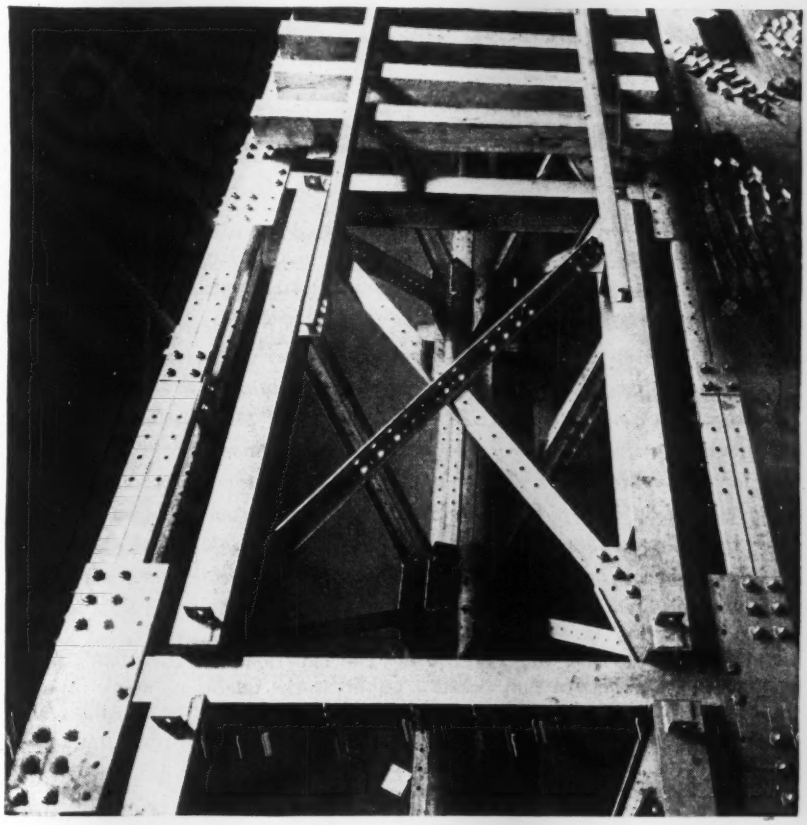


Fig. 4. Timber ties and railroad track are carried on steel stringers framed to floorbeams which connect between the top chords of the deck trusses.

Temperature Data on Virginia Streams

During the summer months the temperature of the water of Virginia streams varies but a few degrees from section to section of the state, limited data obtained last summer by the U. S. Geological Survey reveals. The measurements also indicate that the temperature of the water in a stream heading in the mountains does not increase appreciably as one travels downstream to the normally warmer coastal region.

The readings were taken to aid several industries seeking favorable locations for new plants. Temperatures of the air and water were measured at approximately 30-day intervals at 134 gages well distributed over the three main topographical divisions of Virginia—namely, the mountain, piedmont, and coastal areas. Readings were taken from May to October, 1944.

Although the investigation is considered only a reconnaisance survey, a few general conclusions are possible, including the following: The variation in the average water temperature for the three regions of Virginia appears to be less than the variation in monthly mean air temperature; it was expected that there would be a greater progressive increase in temperature from streams in the mountainous region to those in the coastal plain since the monthly mean temperature in 1944 for the piedmont region was about 4 deg. warmer than for the mountain area and the mean temperature in the coastal region about 2 deg. warmer than the piedmont. The variation between streams within a regions was greater than the variation between averages for the three regions. Some coastal streams were cooler than some mountain streams. Data for the Roanoke and James rivers do not indicate any significant temperature increase proceeding downstream.

The temperature of James River water in May varied from 58 to 74 deg. F., in June from 74 to 78 deg., during July from 76 to 82 deg., in August between 76 and 86 deg., in September between 68 and 74 deg., and during October from 50 to 54 deg. The variation in the Roanoke readings was much the same.

The above information is based upon a report by Donald S. Wallace, district engineer, U. S. Geological Survey, Charlottesville, Va.

Beardsley Ruml on....

Stabilizing the Construction Industry

***Editor's Note**—Mr. Ruml has made the provocative suggestion that a Congressional investigation of the construction industry should be initiated with a view toward providing the means for its stabilization. Behind this suggestion is the thinking of a man whose interest in the construction industry stems from his studies of national fiscal policy and the relation of public works as one element in determination of such policy. Mr. Ruml, widely known as the original author of the "pay as you go" plan for income taxes, is the treasurer of R. H. Macy and affiliated department stores as well as governor of the New York district of the Federal Reserve System. The following exposition of Mr. Ruml's thesis is abstracted from a recent address before the Chicago Building Congress. Mr. Ruml will develop this subject further at an open meeting of the New York Metropolitan Section of the American Society of Civil Engineers on May 16 at 33 West 39th St.*

DURING THE TWENTIES, the government taught us to believe that public works might be used to help even-out the business cycle. But during the depression of the Thirties, we came to have a profound disillusionment with respect to the use of public works as a means of sustaining business activity.

In the spring of 1933, in what was thought to be a bold attempt to produce recovery, an appropriation of $3,300,000,000 was made for public works as part of the National Recovery Act of 1933. By the fall of 1933, it became apparent that public works could not be started merely by appropriating money. Public works require long and detailed planning, legal investigations, site acquisition, and, in many cases, enabling legislation by state and local governments. To meet the urgent need for employment, the Civil Works Administration was hastily put together late in 1933 and this was followed by the Works Progress Administration and later by the Work Projects Administration. Many projects, devised in desperate haste to provide work of some kind for unemployed talent at particular locations were subjected to public ridicule and abuse. The program was admittedly "public work" rather than "public works." Although many of the undertakings could meet the test of necessity and desirability, they broke down on the test of efficiency and reasonable cost.

The experience of the 1930's with public works taught us many things. First of all, it taught us that the scale on which public works must be pressed in order to do any substantial good in a period of unemployment is vastly greater than we had been led to believe. Indeed, it is so vast that the use of public works as a means of stabilizing the whole economy through the phases of the business cycle must be abandoned. The most we should expect—and this is no small gain—is that we may be able with public works and conservation to stabilize the construction industry itself, so that it would have a more even level of activity throughout and over the years.

An undesirable aspect

In addition to magnitude and administrative difficulties, there is another reason for abandoning the idea of using public works as a general cure-all for the business cycle. This other reason is the human undesirability of bringing hundreds of thousands of men into the construction industry and forcing them out again as an offset to the free play of economic forces elsewhere in the business system.

What level of employment in the construction industry should we set as full-time normal for a long-time program? The suggestion has been made that we might take as a rough standard the average rebuilding of our physical plant once a generation, say once in thirty years. This suggestion has the appeal of picturing each new generation turning over to the next generation new, modern structures instead of old, outmoded houses, schools, and factories. Another suggestion is that past experience would validate a level of between 15 and 18 billion dollars a year.

The precise level around which we should direct our efforts toward reasonable stabilization of the industry is less important in some ways than the acceptance of the policy itself. Decision as to level, whether in terms of dollars or of men employed, is a matter of public policy.

But it is important to have some such standard, not only as a basis for advanced planning, but also to indicate how far we ought to go in bringing forward the scheduling of public works at times when private demand is extremely high. It is likely that immediately following the war and for some years thereafter, we shall have a considerable boom in private, residential building. It may well be that this boom, together with industrial demands and public works which cannot be postponed, will be more than sufficient to carry the construction industry beyond the level that we may have agreed we would maintain as a long-time standard normal.

If this should happen, and if at the same time there should be a substantial amount of unemployment, there would be a temptation to accelerate postponable public works, even though a full quota in the construction industry had already been reached. Barring local situations and public works and conservation projects urgently needed for public safety and welfare, it would be wiser to hold back public works in spite of the presence of some unemployment.

Boondoggling is out

A second lesson which has been learned as a result of the experience of 1930's is that the public will not tolerate expenditure by the government that it believes to be wasteful. Leaf-raking and boondoggling are

condemned by public opinion and even the inefficiency which results from the employment of the incompetent unemployed, or from the failure to use known labor-saving equipment is frowned upon. The public rejects the sophisticated rationalization that some purchasing power is better than none at all.

There is another reason why the purpose, scope, and scale of public works programing should be under public discussion. It is desirable that the public should appreciate the magnitude of the program, and should approve the policy well in advance of the time when detailed operations will have to begin. Only in this way can true economy of expenditure be attained. The magnitude of any construction stabilization program over a period of twenty years would make possible dramatic changes in our national physical plant.

Unless there is some comprehensive concept of what is attainable, there will be great waste through the undertaking of thousands of unrelated, efficient details. This is not a justification for a formalized, unified, and imposed national public works strait-jacket into which the future public construction of the country will be tied. It is simply an observation that the whole is greater than its parts, and that many a poor cake has been made from worthy ingredients.

Construction industry problems

The construction industry is greatly involved in public works expenditures, no matter what our policy on public works may be, and the construction industry is a costly and a wasteful industry.

The reasons are not hard to find. Every phase of the industry is subject to the feasts and famines of seasonal and cyclical demand. The circumstances which cause one family to decide to build a house, cause thousands to decide the same way at the same time. The circumstances which result in a profitable outlook for the building of a factory by one company will simultaneously affect thousands of companies. On the other hand, when families and businesses cannot or do not wish to build, broad, general, causative factors are at work which create depression for the construction industry.

The private construction industry has tried to adapt its practices so that the several elements of the industry could survive under these adverse conditions. Architects, building contractors, building supply companies, labor, finance and mortgage companies, all found it necessary—each in its own way—to establish and to hold a price structure high enough so that the days and hours of activity would pay for the time when there was little or nothing to do.

This kind of pricing, though necessary for survival, presents some difficulties. In the first place, it takes the cost of idle time and adds it to the cost of active time so that the active time carried a heavy total expense. In the second place, no such price schedule can be maintained unless outsiders are kept from coming into the industry, and unless insiders understand more or less specifically what the rules of the game are and it is made "convenient" to follow them.

Some restrictive practices

The reasons why restrictive practices spring up in so volatile an industry as construction are easy to understand. In periods of activity, prices are well above actual expenses at the moment, and an outside interest, whether contractor or worker, will be well satisfied to take a narrower margin for the short run, or to deliver a full day's work, or otherwise by competition to take income from an established member of the industry. The days of famine in the industry are supported by these days of feast, and the banquet when it comes must be reserved for the home-folks, not for the minstrel who will sing for his supper and then wander on.

In the low period of the business cycle, in periods of dullness, there is always some small amount of construction which has to be done, and now the insiders must be held in line. Naturally, every element in the industry would prefer some little income to none at all, and active bidding for the business at lower prices might be expected. But this cannot be permitted. The price schedule must be kept up in order to make sure that when the activity comes again, the income then received will be sufficient to provide a little more than a break-even for busy and idle time taken as a whole.

It is not necessary to recite in specific detail the restrictive practices for which the construction industry is notorious. All these practices spring from a common need, to make sure that the scale of prices obtained when there is work to do is sufficient to pay for the idle time too. The high schedule of prices is forced higher still by the uncertainty of how long the periods of idleness will be. A retailer knows that spring and winter comes every year, and therefore he can figure his annual costs. In construction, who knows how long a boom may last or when it may come again?

The restrictive measures in the industry are in many cases ingenious, in some cases illegal, in all cases for the purposes of price maintenance and the control of competition. In spite of extenuating circumstances, it is unwholesome in the national interest to go along indefinitely with an industry which for its own survival has to have a considerable element of the outlaw in it. As long as illegal practices are condoned on the front of restrictive and collusive rules, they will be excused wherever they can be exploited to make a profit or to fortify a power position. Tolerance of illegal practices leads to a special kind of cooperation between government, labor and business—the cost of which is paid for by the consumer-citizen, both in high prices and in the corruption of his government.

We must never forget that the bulk of construction over a period of time arises from private demand and that the greater the proportion of private demand the healthier the industry will be. Optional public works should be looked to only as a balancing factor, not as the main source of demand for construction.

Public works and construction

Therefore, with these considerations in mind, the stabilization of the construction industry through the planned timing of public works can be confidently expected to yield important benefits. First of all, stability of employment should eliminate the uncertainties and fears which make the industry irresponsible, always fighting for its life. Second, construction costs should fall sharply and the earning of workers and the profits of contractors should increase. Third, the total public construction program could be well planned. Certainly a stabilized industry would produce a vastly greater quantity of construction output and, over a period of time,

would change in a fundamental way the structural American environment.

But here we come to a real difficulty. It is impossible to justify large public expenditures today to support the construction industry at a high stabilized level as long as it operates under existing restrictive practices. Nor is it likely that the construction industry will change on its own initiative. Indeed, a firm commitment on the part of the federal government to see that a high level of construction is held throughout the year and over the years would tempt into the industry a new following which, to be sure, would leave the industry on a stabilized level, but still with all elements only partially employed and with costs as high as ever. The government and the private consumer would still not be getting their money's worth since the industry would still be pricing for idle time.

Need for investigation

It is my opinion that a program for stabilizing the construction industry through the use of public works should be accompanied by a Congressional investigation of the industry with recommendations that would result in its reorganization. Such an investigation should be of the same dignity and competence as that of the National Monetary Commission following which the Federal Reserve System was established. If it should be found that the industry requires certain immunities under the Sherman Act and state anti-trust laws, it should be subjected to corresponding regulation. If some of the restrictive practices of the industry should be continued, even under high stabilized production, these practices should be sanctioned by law and supervised by an appropriate regulatory body.

The construction industry stabilized by public works expenditures and regulated by a government agency would be a different industry from what it is today. It would still be competitive, just as the radio or the banks or the airlines are competitive; it is possible that the industry would be even more competitive than it is today. The dominant factors in the industry would turn to innovations and economies as their way of bidding for a larger section of the construction pie, and since under these circumstances a larger pie is assured, who will complain if quality is improved?

An industry that is looked to for at least 8 percent of the national product is certainly a matter of national concern, particularly when the industry does not appear to be able to stabilize itself without resorting to inefficient, restrictive practices which increase costs, postpone innovations, and introduce elements of lawlessness into the industry. When, added to these considerations, the industry is indispensable as a source of essential public works, of housing and transportation, and as an outlet for the investment of the people's savings; when it is to be the beneficiary of billions of dollars of planned public expenditures over the years, it is certainly discussable that the industry should have a quasi-public utility status. In any case, the industry should be given a chance under the law to reorganize for the most efficient service to the community as a private, competitive construction industry.

A good time for inquiry

Now is a particularly good time for a Congressional inquiry into the needs of the construction industry. There is no nation-wide scandal to obscure real problems and result in distorted legislation. Further, the period immediately following the war will probably see the industry in a fairly healthy condition as far as demand is concerned. During this period the investigation could go on without the presence of crisis in the industry forcing premature judgments.

The suggestion for a Congressional inquiry into the construction industry should not be used as an excuse for delay in the preparation of detailed plans and specifications for federal, state, and municipal public works. Experience teaches us that the practical circumstances of getting work under way make it desirable to have plenty ready to do. If a commission of inquiry should be appointed, its report would be many months in preparation at best. Nor is it likely that action would be taken on such a report after it was issued until after much debate, discussion and popular education.

This suggestion for a Congressional inquiry into the construction industry, which I first made a little more than a year ago, has had a mixed and indifferent reception by the industry. A few have told me privately that they thought it was a good idea but that nothing would happen until [illegible] too late.

I have said that we should not wait for a Congressional investigation to take many actions that would be beneficial to the construction industry and to the public in any case. A recent report by Miles Colean issued by the National Planning Association with the concurrence of its agriculture, business and labor committees recommended; first, that there should be established in some appropriate agency a Bureau of Construction Economics which should be authorized to assemble, maintain and publish regularly essential series of data with respect to construction and should have appropriations consistent with the carrying out of this purpose. Second, that facilities should be provided for an extensive program of technical and industrial research organized after the pattern of the National Advisory Committee for Aeronautics so as to represent all the interests involved. Third, since a variable public-works program must be regarded as a basic instrument of the stabilization of the construction industry, the federal government should organize and implement its agencies so that the objective of stabilization might be attained. And finally, that precaution should be taken whereby in the face of emergency we should be insured against the unhappy consequence resulting from a sudden withdrawal of credit for construction enterprise. (For a fuller summary of the Colean report see *ENR* Feb. 15, vol. p. 227).

A Congressional investigation of the construction industry, let me repeat, is not necessary in order to get much good work done. I make this suggestion of a Congressional investigation of the construction industry for what it may be worth. I certainly do not intend to press the matter. My principal interest is in fiscal policy, not in the construction industry. As a private citizen, I have the same general concern for the construction industry that I have for any industry—that it should serve the people well, and that it should prosper. Let me make this perfectly clear, an investigation of the construction industry is not necessary in order to have a sound, national fiscal policy. An investigation is necessary, in my opinion, if we are to have a sound construction industry.

postwar frictional unemployment should be calculated as approximating the current 1 million or the 3 million so-listed in the prosperous year of 1929. Additional uncertainties cloud the estimates of gross national product. Notable among them is the fact that no one is sure of the war's effect upon man-hour productivity trends, in view of the fact that half of our current output has consisted of products that had no substantial counterpart in our peacetime price or production series.

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Nevertheless, despite such qualifications, it is fair to say that we do have a general conception of the magnitude of our postwar goals. Although they are well within our production potentials as demonstrated in this war, they are formidably beyond any previous record of peacetime achievement. Only the most sanguine optimism could lead one to expect that they will be achieved without concerted will, planning, and cooperative effort. Only blind recklessness could engender confidence that once attained they will automatically be held, let alone expanded in normally healthful growth.

If we were to follow past patterns, our war-built boom would, after a period of uncertain length, collapse into disastrous depression. The very magnitude of our recent growth would contribute to the depth and duration of the subsequent trough. Yet a fall even to the level of our previous peacetime-peak-year 1939, has been estimated by The Federal Reserve Board to imply unemployment for between 15 and 20 million persons. If human values have importance, that is something that must not be allowed to occur. If business values have importance, we must not tolerate again such losses as occurred from 1930 to 1933, when sales over the four year period were $128 billion less than would have been provided if the 1929 level had held, and corporate profits declined from more than $7 billions in 1929 to an average annual loss of $1 billion over the next four years. A repetition of these things cannot be tolerated—*if foresight and cooperative effort can prevent them.*

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In January of this year Senator Murray introduced in the Senate a bill entitled "The Full Employment Act of 1945." It instructs the President to submit to Congress plans for eliminating both unemployment and inflation, including recommendations for correcting structural defects in the economic system. It provides for a Joint Congressional Committee to consider the proposals of the President, to take testimony from experts and the general public on these proposals or any others it may wish to consider, and after weighing all the facts to submit its findings to Congress. It provides for an advance budgeting of the constituent parts of a full-employment economy, and commits the Federal Government to provide, in advance, for sufficient expenditures (through private contractor channels) to make up for the gap between estimated private expenditures and the amount necessary to assure full employment.

By no stretch of the imagination can The Full Employment Bill, in its present form, be regarded as acceptable to business. Yet it may well present a test of whether or not American business can deal with problems in this area in a statesmanlike fashion. Such statesmanship will consist in demonstrating first, that the Bill is not acceptable because of deficiencies which preclude the possibility of its accomplishing the avowed purposes; and second, that business is able and anxious to offer constructive suggestions for remedying these deficiencies.

It is easy to point to weaknesses in the Bill. To mention only a few of major importance: The proposal to make advance Federal expenditures to compensate for estimated deficiencies in prospective private expenditures is completely impracticable. No one in the country can predict future trends with sufficient accuracy for this purpose; no one can tell what the constituent parts of a really high, *stable* peacetime budget should be, for in our boom-or-bust economy we have no stable pattern to project; no one can tell, within reasonable limits, how much the government should spend *in advance* to assure full employment. The Bill pronounces labor's right to work without defining commensurate responsibilities which it should exercise. It does not define the areas of proposed government expenditure in such a way as to allay business fears of government competition or the general public suspicion of leaf raking. Above all, the Murray Bill is defective in that, despite a somewhat vague pronouncement in favor of forwarding private business activity, it recommends a single specific designed to supplement such activity rather than stimulate it.

The very definition of certain of these faults suggests their remedies. But the positive task of stating how the Bill should be amended in order that it may have effective usefulness is far from simple. Yet it is enormously to the advantage of American business to undertake it. Fortunately, there is a representative group sponsored by industry, The Committee for Economic Development, which has for some time been working intensively upon the problem, and which is excellently equipped to offer sound and progressive advice. It should be used for this purpose.

American business cannot afford to take a negative attitude toward legislation in this field. Some legislation undoubtedly will pass, for the problem is one in which there is a grave government responsibility. But equally there is a comparably important responsibility upon all citizen groups. None of them has more to gain or lose from the rise or fall of prosperity than American business.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Co., Inc.

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AMERICA WANTS PROSPERITY

A BOOK to be published early in April by the McGraw-Hill Book Company carries the provocative title "Prosperity: We Can Have It If We Want It." Its authors, Messrs. Shields and Woodward, state in vigorously challenging terms their conviction that the United States will emerge from war with human, material and technological resources adequate to provide a nation-wide standard of living unprecedented in world history. They present, too, their formulation of the several policies and procedures which must be followed by government, business, and labor if we are to realize our potential for a high and sustained prosperity unmarred by prolonged periods of severe unemployment and business stagnation such as have haunted our economic past.

The specific proposals set forth will elicit both enthusiastic acclaim and acrid dissent, for the book deals in far from gentle fashion with many of the currently fashionable panaceas for assuring prosperity by magic formula. It examines, and discards as effective guarantors of prosperity, whatever their individual merits upon other grounds, programs for public works, slum clearance, subsidizing of small business, foreign loans, social insurance, deficit government spending, redistribution of income, the numerous formulae for monetary management, repeal of the anti-trust laws, or any of the loosely-phrased admonitions that government should do nothing and allow everything to take its course untrammeled by controls of any kind.

On the positive side, the book urges clear recognition of the fact that prosperity, under a system of business enterprise, depends primarily upon the existence of competitive incentives that spur capital investment to provide better tools and equipment, that improve organization and technology to insure continuously increasing productivity per man-hour of work, and that enlarge markets by producing what the consumer wants at lower prices to the end that real incomes may be increased.

In short, prosperity depends upon profitable and expanding business and employment opportunity, so it becomes the part of enlightened government, business, agriculture and labor policy to promote those measures which will forward rather than retard the major aim of expanding production.

However great the room for dissent upon the adequacy, or the phrasing, of the specific recommendations it makes, the approach of this book has one virtue of solid merit. It attacks positively the problem of what steps should be taken to achieve and hold prosperity rather than merely devising a poultice to be applied when and if we run into a decline.

Virtually all responsible spokesmen for government, and for business, labor, and agricultural groups, are agreed upon the goal of prosperity. Moreover, they agree that, insofar as possible, it should be achieved through the effort of private enterprise, with government intervention utilized only as a last resort. But despite this unanimity, almost all public discussion of the problem has concentrated upon the nature, the extent, and the timing of such government expenditures as may be found necessary to combat deflation. Since upon this question there is far from general agreement, our procedure has created an exaggerated sense of divergence in a field in which, so far as fundamentals go, we all are in accord to quite an unusual degree.

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No confusion should be caused by the fact that the generally current phrase for prosperity is "full employment." The latter phrase merely states the goal in terms of human values, which are good terms in which to state any goal. What matters is that we generally are agreed as to what we mean when we say that we want prosperity or full employment. Not only do we know what we mean, but within very rough limits we can give dimension to our concepts. There are a few whose appraisals are somewhat lower, but most competent estimators set the goals for about 1950 at an average annual employment in civilian jobs of between 55 and 57 million persons, with a gross national product of between $185 and $200 billion measured at 1943 price levels. This contrasts with the 1944 level of non-military employed of 51½ million, and a gross output for the end of 1944 of over $200 billion. It assumes a reduction of the average workweek to 40 hours.

It will take some such levels as these to provide employment for those who seek work, with only sufficient "frictional" unemployment (those temporarily listed as unemployed because of the normal turnover between jobs) to afford reasonable labor-market flexibility to both workers and employers. The non-military employment figures are generally consistent with the officially stated postwar goal of jobs for 60 million workers, since the latter figure is generally understood to be an estimate of the *labor force,* which includes members of the armed services and an allowance for frictional unemployment.

There are a number of reasons why the estimates cannot be figured more closely, and why no one can be very confident even of the validity of the stated limits. The chief points of doubt in the employment estimates relate to how many withdrawals there are likely to be on the part of women, oldsters, and youngsters, who now are in the labor force to a number more than 6 millions beyond normal expectancy; how many men will be retained in the armed forces; and whether the

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CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

HIGHWAY AND BRIDGES, VIRGINIA

OWNER: Virginia Department of Highways, Richmond.

PROJECT: Construction of 6.089 miles of highway and three bridges in Albemarle County, from a point 1.597 miles east of Nelson and the Albemarle County Line to 11.337 miles west of the West county line of Charlottesville, Route No. 250, Va. Alternates were asked on the paving, either 10"-9"-10" waterbound macadam, or 8-in. reinforced cement concrete pavement. Award made on basis of waterbound macadam. Bridges included are: one-span steel beam bridge over Stockton Creek at Sta. 331+35, span length 65¼-ft., 22-ft. clear roadway; one three-span reinforced concrete beam, each span 35-ft., Sta. 207+50, overall length 112½-ft., 28-ft. clear roadway; and one three-span reinforced concrete beam, each span 40-ft., Sta. 239+75, overall length 127½-ft., 28-ft. clear roadway.

CONDITIONS: Contractor to furnish all materials and complete work in 210 calendar days from date of award. Rail and highway transportation facilities available. Wage rates are those prevailing in the area.

BIDS: Seven bids were received March 8, 1945 on the waterbound macadam basis, ranging from the contract low of $519,517 to $616,028. On the concrete pavement basis the bids ranged from $592,280 to $711,101, six bids having been received.

LIST OF BIDDERS: (Waterbound macadam pavement)

1. The Lane Constr. Corp., Meriden, Conn. (contract) $519,517
2. W. N. Jackson, Roanoke, Va., and W. E. Graham & Sons, Cleveland, N. C. 522,419
3. Ralph E. Mills Co., Inc., Roanoke, Va. 530,881
4. Perkins-Barnes Constr. Co., Inc., Blackstone, Va. 533,046
5. Mecklenburg Constr. Co., Durham, N. C. 574,907
6. Pendleton Constr. Corp., Wytheville, Va., and Albert Bros., Contractors, Inc., Salem, Va. 583,738
7. Bero Engr. & Constr. Corp., Langley Field, Va. 616,028

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing and grubbing	9 ac.	$375.00	$300.00	$350.00
2. Regular excavation	333,622 c. y.	.50	.48	.51
3. Concrete, Class A	991 c. y.	32.00	33.00	28.00
4. Concrete, Class B	44 c. y.	24.00	38.00	28.00
5. Metal reinforcement	84,330 lb.	.07	.06	.06
6. Conc. rt.-of-way monuments	146 ea.	10.00	2.00	2.00
7. 6-in. pipe underdrains	520 l. f.	1.25	.75	1.50
8. Subgrade underdrains, CD-1 or CD-2	2,290 l. f.	.50	.75	.75
9. 15-in. concrete pipe	669 l. f.	1.75	1.90	2.00
10. 18-in. pipe	1,302 l. f.	2.00	2.25	2.50
11. 24-in. pipe	435 l. f.	3.25	3.25	3.50
12. 30-in. pipe	102 l. f.	4.75	6.00	6.00
13. 36-in. pipe	156 l. f.	7.00	10.00	10.00
14. 60-in. pipe	75 l. f.	18.00	20.00	16.00
15. 12-in. pipe	303 l. f.	1.60	1.70	1.80
16. 18-in. pipe (3,000-D)	204 l. f.	2.25	2.75	3.00
17. 24-in. pipe (3,000-D)	327 l. f.	3.45	4.00	4.00
18. 36-in. pipe (3,000-D)	240 l. f.	7.50	8.00	8.00
19. 18-in. pipe (vit. clay)	33 l. f.	2.50	2.50	3.00
20. Pipe (relaid)	110 l. f.	2.00	5.00	3.00
21. Concrete Class C	94 c. y.	30.00	30.00	30.00
22. State project markers	3 ea.	10.00	5.00	5.00
23. Class 1 dry riprap (18-in. deep)	820 s. y.	3.00	6.25	6.00
24. Paved ditch	4,019 s. y.	1.10	1.50	2.00
25. Dry rubble masonry wall	50 c. y.	2.25	14.00	20.00
26. Brick masonry (posts)	4 c. y.	25.00	45.00	35.00
27. Mortar rubble masonry (post and walls)	16 c. y.	20.00	24.00	25.00
28. Concrete posts reset	2 ea.	10.00	10.00	25.00
29. Subgrade treatment material	16,684 ton	1.95	2.00	2.10
30. Stone, No. 9	158 ton	3.50	4.50	4.50
31. 6-in. waterbound macadam	6,489 s. y.	1.10	1.24	1.50
32. Bitum. material, RC-1 or RC-2	5,407 gal.	.12	.12	.12
33. Covering material	195 ton	5.00	4.50	4.50
Bridge—Steel Beam Span				
34. Struct. steel (superstructure)	Lump Sum	2,250.00	2,620.00	2,000.00
35. Lumber (superstructure)	Lump Sum	2,300.00	2,137.50	1,800.00
36. Class B concrete (substr.)	340.4 c. y.	25.00	29.40	20.00
37. Reinforcing steel (substr.)	680 lb.	.07	.06	.06
38. Class A excavation (substr.)	98 c. y.	5.00	3.75	2.00
39. Class B excavation (substr.)	292 c. y.	6.00	3.75	4.00
39a. Remove old structure	Lump Sum	1,200.00	450.00	300.00
Bridge—Reinforced Concrete, Three 35-ft. Spans				
40. Class A concrete (superstr.)	170 c. y.	55.00	35.50	40.00
41. Reinforcing steel (superstr.)	44,000 lb.	.07	.06	.06
42. Class A concrete (substr.)	191.8 c. y.	38.75	38.00	40.00
43. Class B concrete (substr.)	142.8 c. y.	30.00	31.00	26.00
44. Reinforcing steel (substr.)	8,130 lb.	.07	.06	.06
45. Class A excavation (substr.)	266 c. y.	1.00	3.75	2.00
46. Class B excavation (substr.)	444 c. y.	3.00	3.75	4.00
Bridge—Reinforced Concrete, Three 40-ft. Spans				
47. Class A concrete (superstr.)	194.5 c. y.	55.00	32.90	40.00
48. Reinforcing steel (superstr.)	50,275 lb.	.07	.06	.06
49. Class A concrete (substr.)	141.4 c. y.	38.75	33.00	38.00
50. Reinforcing steel (substr.)	10,909 lb.	.07	.06	.06
51. Mortar riprap	1,028 s. y.	8.00	12.00	9.00
52. Class A excavation (substr.)	59 c. y.	4.00	3.75	2.00
53. Class B excavation (substr.)	139 c. y.	8.00	3.75	6.00
Pavement—Regular Bid				
54. 10-9-10-in waterbound macadam	85,873 s. y.	1.57	1.67	1.70
55. Bituminous mat'l., RC-1 or RC-2	114,655 gal.	.12	.12	.12
56. Covering material	4,302 ton	5.00	4.50	4.50
Pavement—Alternate Bid				
57. 8-in. rein. cem. conc. pavmt.	85,813 s. y.	3.25	2.87	.....
58. Bituminous mat'l., RC-1 or RC-2	158 gal.	.12	.30	.....
59. Covering material	8 ton	5.00	7.00	.....

EARTHWORK AND STRUCTURES TUCUMCARI PROJECT, NEW MEXICO

OWNER: U. S. Bureau of Reclamation, Tucumcari Project, Tucumcari, N. Mex.

PROJECTS: Turnouts, checks, weirs, culverts, drops and chutes for Bell, Elliott, Roberts, State, Jack County, Liberty, Young, Coulter, Hurley and Bend laterals and sublaterals for Conchas Canal, Tucumcari project, New Mexico. Site of work from two to four miles northwest of Tucumcari, N. M.

CONDITIONS: Government to furnish cement, sand coarse aggregate; reinforcement bars; precast-concrete pipe; metalwork for stop-plank guides; weep pipes; metal weir crests; metal gages; lumber for permanent installation; gates; paint materials; anchor bolts; bolts, washers, screws, spikes and large nails; and all other materials that are to become part of the finished structures. Rail and highway transportation facilities available. Time for completion: 100 calendar days. Preference rating AA-3. Wage rates specified as minimums are: skilled labor, $1.25 to $1.50 per hour; semi-skilled, 60c. to $1.00; and common, 60c.

BIDS: Two bids were received February 12, 1945, the low of $130,041, and $159,168.

LIST OF BIDDERS:

1. Lym Engineering Co., Salt Lake City, Utah (low bidder) $130,041
2. Robert E. Ziebarth, Long Beach, Calif. 159,168

Item	Quan.	Unit Prices (1)	(2)
1. Excavation for structures	4,800 c. y.	$1.20	$1.66
2. Backfill	11,400 c. y.	.35	.98
3. Compacting backfill	6,000 c. y.	1.80	.81
4. Concrete in structures	2,150 c. y.	40.00	47.00
5. Place reinforcement bars	205,000 lb.	.036	.061
6. Dry-rock paving	2,580 s. y.	3.63	5.45
7. Erecting timber in structures	5 Mbm.	96.80	115.00
8. Lay 15-in. concrete pipe	3,240 l. f.	.97	.50
9. Lay 18-in. concrete pipe	36 l. f.	1.06	1.80
10. Lay 21-in. concrete pipe	36 l. f.	1.21	2.10
11. Lay 24-in. concrete pipe	596 l. f.	1.35	2.30
12. Lay 30-in. concrete pipe	72 l. f.	1.45	8.00
13. Lay 36-in. concrete pipe	108 l. f.	1.93	8.50
14. Install gates and miscellaneous metalwork	48,000 lb.	.04	.049

SMOOTH AS OIL!

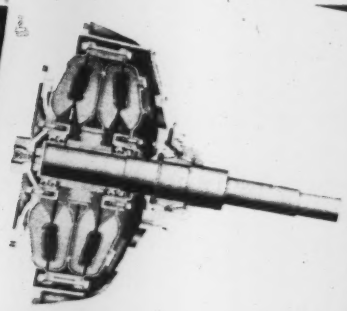
No shock—no stall—no loafing—with FLUID-DRIVE LORAIN 82!

YOU can tackle a mountain of rock—or any other tough job—with a Lorain 82 and get the most out of every work-minute! These husky shovels are equipped with a life-saving, shock-absorbing hydraulic coupling that smooths out heaviest digging shocks and keeps the engine pulling at peak power under toughest loads. You just can't stall the engine!

No matter how big the rock or how tight it's lodged, the Lorain 82 hangs on until it's in the dipper. Sudden jerks, impacts and other shocks are cushioned by the spinning oil clutch—eliminating stress and strain on mechanism and cables and greatly lessening operator fatigue.

Combine this life-prolonging feature with Lorain center-drive direct-to-the-point power application, two-speed chain drive crawler, all-steel all-welded boom, all-steel dipper stick and new, streamlined dipper and you've got the ideal rock shovel—the Lorain 82!

If you want shovel performance that's literally "smooth as oil" and new, low per-yard handling costs, write for complete data on the shockproofed shovel.



Power for the Lorain 82 flows through this hydraulic coupling. Shocks impacts and sudden strains on the mechanism and cables are cushioned and absorbed by the fluid connection.

Reg. Trade Mark

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High sustained efficiency and low maintenance costs are inherent characteristics of Cook Deep Well Turbine Pumps—the *only* Turbines having *all these features!* 1—Easy adjustment of Impellers. 2—Pin Clutch Safeguard against damage to motor and line shaft. 3—Oil or water lubrication. 4—Precision tested Impellers of Red Brass mathematically designed to give *maximum upward thrust* to water column. 5—Stream-lined passage through bowl minimizes friction and turbulence, *delivers greater gallonage at head.* Many other salient reasons for the swing to Cook Turbine Pumps are shown in Catalog 360-A, free on request . . . Ask for your copy, today.

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DEEP WELL TURBINE PUMPS

Oil or Water Lubricated

A. D. COOK, INC. • Lawrenceburg, Indiana

The Week In Engineering and Construction

(*Continued from page 59*)

Favors U. S. Engineers' flood control program

The Arkansas Legislature has passed and on March 6 the Governor signed a concurrent resolution endorsing the flood control program planned by the U. S. Engineers and authorized by Congress for the several river basins of the state. It also opposed the establishment of an Arkansas Valley Authority, and requested that the river basins of the state be developed by the Corps of Engineers of the U. S. Army.

The resolution also urged Congress to make available to the Army Engineers sufficient funds "to construct and operate all the projects necessary and incidental to a comprehensive plan of flood control including the attendant benefits of navigation, irrigation, and incidental power, whenever economically sound, and that such construction and operation be expedited in the aid of the postwar effort."

Levee plans under way

Plans and specifications for Arkansas River levee construction projects from Fort Smith to Pine Bluff, recently authorized by Congress for the Little Rock district, are being drawn up and surveys have been started by a crew of engineers, Col. Roy D. Burdick, U. S. district engineer, has announced.

"Only limited funds are available for the work. Completion of field work, plans and specifications for all authorized levees depends on additional appropriations by Congress," Col. Burdick said. "Construction of the projects also dependents on funds appropriated by Congress and assurances of cooperation by local agencies. It is probable that construction will not be started until the war is over."

• • •

Congress urged to study low-income housing

Congress was urged to make a thorough study of the whole problem of housing needy families before adopting a costly postwar public housing program, in a statement made recently before the Senate subcommittee on housing by Douglas Whitlock, of Washington, president of the Producers' Council, national organization of manufacturers of building materials and equipment.

Whitlock pointed out that up-to-date information must be obtained regarding

"...now use Ring-Free exclusively..."

Excerpts from letter of—
N. G. HILL
N. G. Hill & Co., Contractors
Phoenix, Arizona

"...four years ago, after we purchased a fleet of Chevrolet trucks for a road construction job on Highway 77, we were induced to try Ring-Free Motor Oil.

...the test was a tough one due to weather conditions...heavy snow and rain in winter...heat and dust storms in summer.

...during all this time we did not pull a head or pan in any of the trucks except one damaged by striking a huge boulder.

...after the job was completed we removed heads and pans on all motors which had from 50,000 to 60,000 motor miles.

...all compression rings were free...all drain holes in oil rings open...also drain back holes in pistons completely open and no carbon on the under side of the pistons. Cylinder heads and valves were also clean and all valve stems free in the guides. Engine pans and oil pump screens were cleaner than we expected...all bearings were in good shape.

...we now use Ring-Free exclusively in all our equipment*...we recommend Ring-Free Motor Oil to other contractors."

** 36 Trucks—Fords, Chevrolets, Internationals; 6 A.C. Tractors, Diesel powered. 1 D-8 Caterpillar; 3 Graders—2 powered by International and 1 by Caterpillar motor; 1 International T. D-40 Tractor; 1 Lorraine 40—¾ cubic yard power shovel; 3 Light Plants powered by Kohler motors; 1 Gravel plant powered by 8800 Caterpillar Diesel. Also numerous pick-ups and station wagons.*

Operators of all types of equipment report lower-cost, more efficient performance with Ring-Free Motor Oil. Find out how Ring-Free can help lick your toughest lubrication problems... Phone or write the nearest Macmillan office.

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both the number of families which will require housing assistance after the war and the number of existing dwellings which will be available for that purpose when the postwar private home building program has gotten under way.

"In addition," he said, "Congress should bear in mind that during the first few years after reconversion is completed, the construction industry will need to devote its entire resources to the huge accumulated private building needs that must be met as soon as possible. It is questionable whether any important amount of public housing could be undertaken during that period without interfering with urgently needed private construction.

"Moreover, it is entirely possible that the large number of public housing units built before the war may be entirely adequate to meet the postwar need, when supplemented by the thousands of other existing homes that will become available when private home building is resumed.

"If we are to have an economy of virtually full employment in the early postwar years, the number of families needing housing assistance from the government will be considerably less than in the past.

"There will be some families unable to provide decent housing for themselves because there is no family member physically able to work, and there also will be families whose incomes are too low to enable them to house themselves properly, even though the head of the family is employed. But in an economy of maximum employment and high wage rates, such as we are encouraged to look forward to, the total number of needy families should be relatively small.

"In planning to provide housing for low-income families, we must not forget that building brand new homes at public expense is not the only way to solve the problem. Indeed, it is a last resort, for it is wasteful to build thousands of new dwelling units, if there is a sufficient number of sound, decent, acceptable older dwellings in which the needy families can live with as many comforts as a large proportion of our self-supporting families enjoy.

"The extent of the need can not be determined in Washington. The only way to judge the adequacy of the present housing supply is to make an inventory of the housing situation in each individual community. This means comparing the nature and number of existing homes, plus those scheduled to be built, with the number and types of families to be housed. If the inventory shows that there will be a sufficient number of suitable homes for all local families, there certainly will be no need to build additional dwellings for low-income families in that community.

"When there is an adequate supply of existing dwellings which meet accepted standards, the needy families can be housed in those dwellings with the aid of local welfare funds, administered by local boards made up of local people who know local conditions."

. . .

Preliminary engineering on two Houston tunnels

A contract for engineering services preliminary to making application for $5,000,000 federal aid in constructing two highway tunnels under the Ship Channel at Houston, Tex., has been awarded to Palmer & Baker, consulting engineers, Mobile, Ala. The estimated cost of the two tunnels is about $10,000,000. They are post-war projects. The navigation district at Houston voted $1,250,000 in bonds and the county voted $3,750,000 to help pay for the tunnels. A $5,000,000 federal grant is being sought to supply the remaining necessary funds.

The contract calls for engineering studies and traffic surveys at nine possible sites for the tunnels, also a report on the economic justification for the project. The engineering firm

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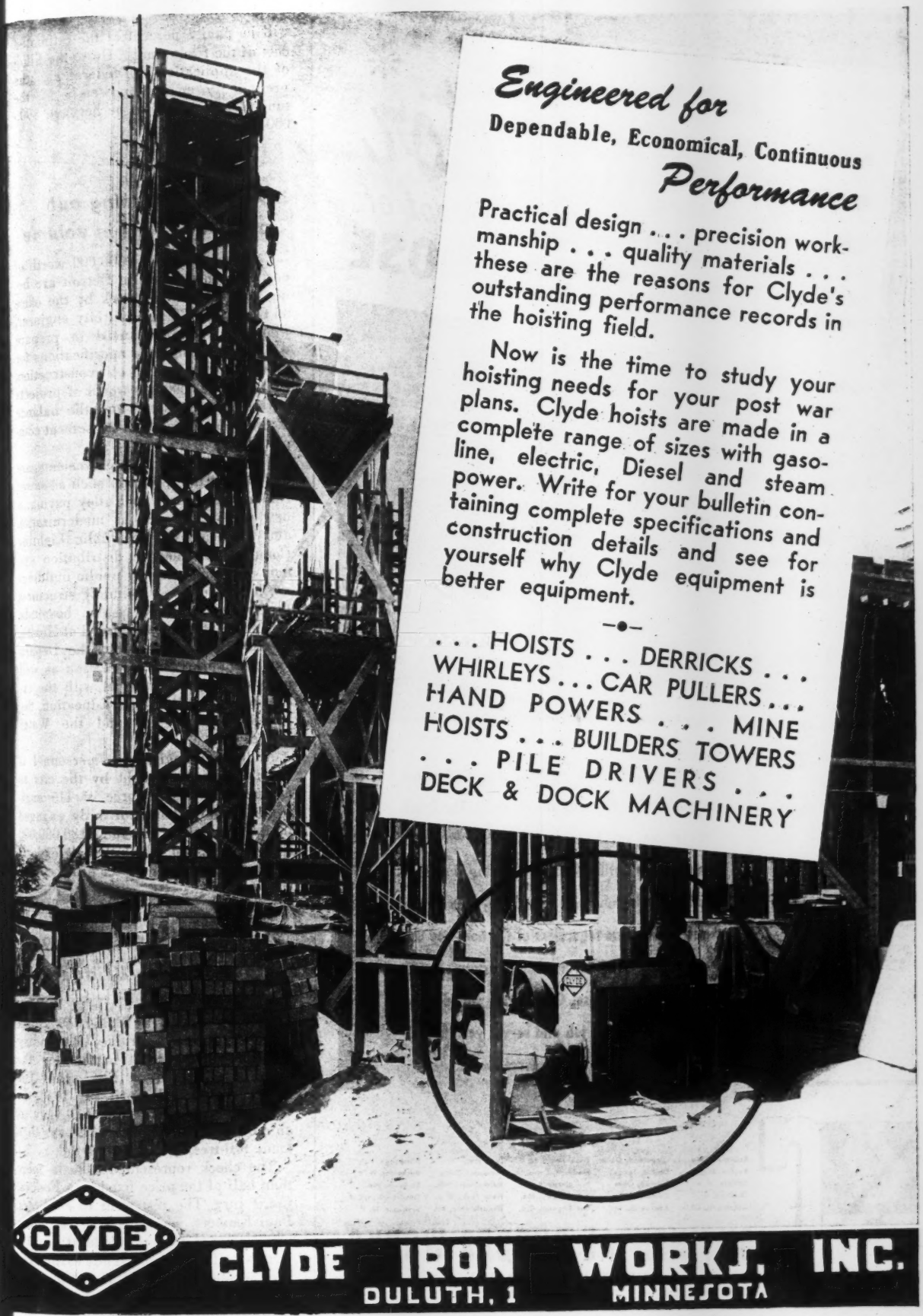

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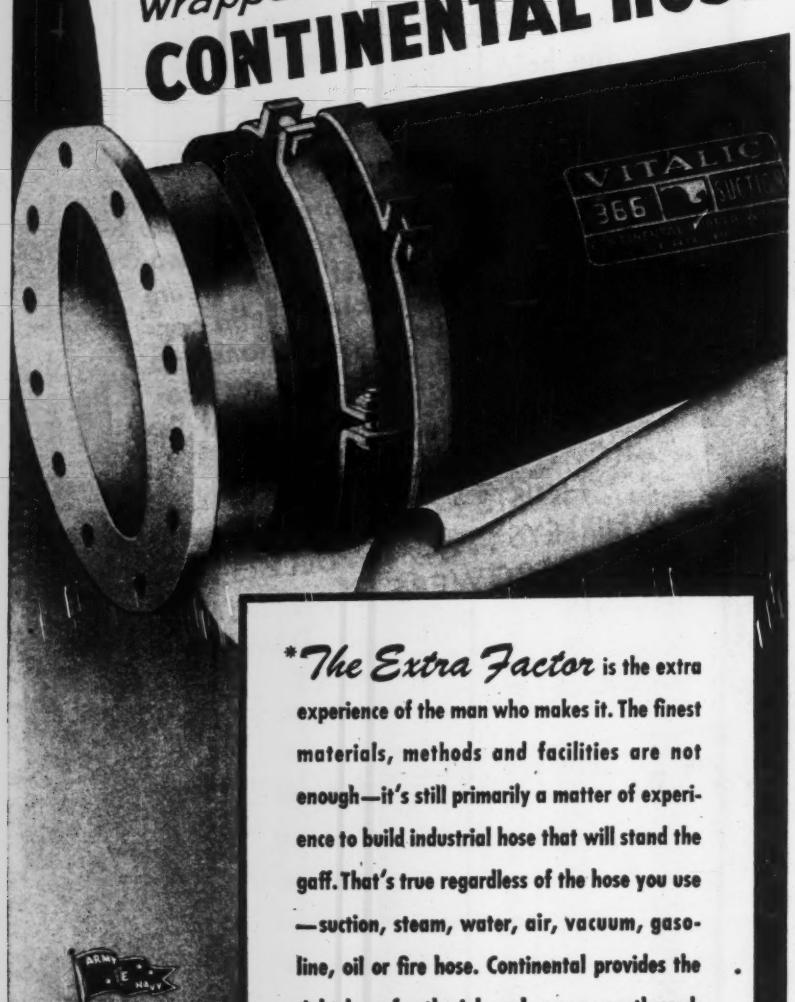

*The Extra Factor is the extra experience of the man who makes it. The finest materials, methods and facilities are not enough—it's still primarily a matter of experience to build industrial hose that will stand the gaff. That's true regardless of the hose you use—suction, steam, water, air, vacuum, gasoline, oil or fire hose. Continental provides the right hose for the job and serves you through its nearby factory branch warehouses.

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will be paid 1 percent of the estimated cost of the two tunnels. Up to the filing of the application for federal aid, the preliminary engineering costs of the tunnels is expected to be between $90,000 and $100,000.

• • •

Detroit is turning out postwar plans in volume

Contract plans for $500,000 worth of postwar construction in Detroit are being completed every week by the office of George R. Thompson, city engineer, who has been authorized to prepare working drawings and specifications for $130,000,000 worth of construction. Plans for $28,000,000 worth of projects have been completed and the balance of the program is about 20 percent complete.

All kinds of civic improvements are included in this program such as sewer construction, street and alley paving, a new airport, as well as modernization and extension of the Public Lighting Commission's electric distribution system. A wide variety of public buildings are being designed including structures for the zoo, library system, hospitals, and police stations, the Board of Health, Welfare Department, and the Department of Parks and Recreation as well as other city departments with the exception of the Board of Education, the Housing Commission and the Water Board.

Additional engineering personnel is constantly being sought by the city to augment its design force of 115 engineers and architects currently engaged in drafting plans for the $130,000,000 postwar program, which the city expects to get under way soon after peace comes.

• • •

Payment of $1,354,349 closes Gandy Bridge deal

On March 19 Federal Judge William J. Barker signed a $1,354,349 check payable to Gandy Bridge Co., ending the nine-months court battle over the Tampa-St. Petersburg, Fla., span. The bridge was seized April 27, 1944, by order of the Secretary of the Navy as an aid to the war effort, and it was then made toll-free. (*ENR* Jan. 4, vol. p. 7.)

The check represented a little more than half of the price fixed by a Federal Court jury. The rest went to creditors. Paul Emmert, Gandy Bridge Co. attorney, declared that the federal government's half came from funds earmarked for Florida in the federal aid highway fund and thus was lost to the state for highway construction.

Q { Will "M. P. T."* Help You Win Profitable Contracts?

A You bet it will. "M. P. T."* per machine and man-hour means lower costs and a lower, winning bid. For instance: a contractor suspected he was losing valuable time lubricating his machines. The Alemite Lubrication Specialist recommended power lubrication that was brought *to the job.* Now, he lubricates track roller bearings in 2½ seconds—fills transmission and final drives at the rate of 14 pounds per minute! Checked your lubrication times lately?

**More Productive Time*

Q **Does "on the job" lubrication save on lubricants?**

A And how! This contractor was not only using too much time for lubrication but he also thought he was wasting lubricants. So, he got an Alemite Portable Service Station. Using this "barrel to bearing" method of applying lubricants he saved 19% on consumption of grease and oil. Every bearing got clean, uncontaminated lubricants and in far less time! It's savings like these that can make "low bid" contracts profitable.

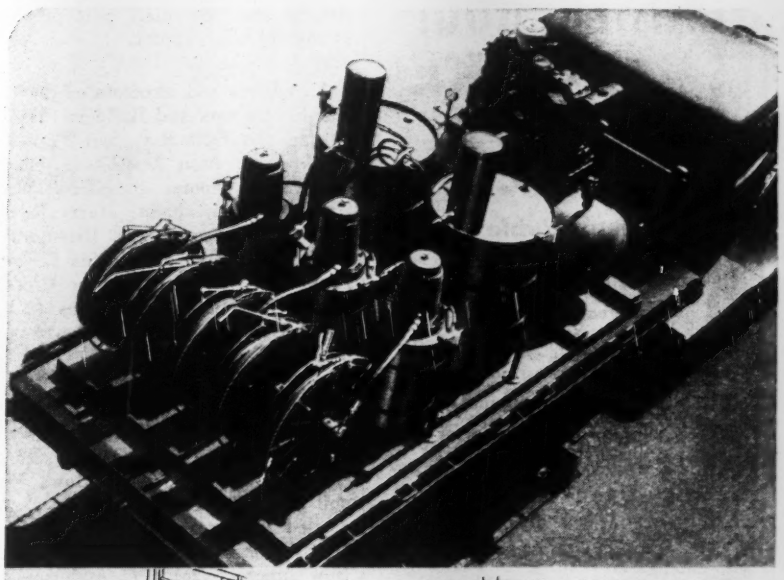
Alemite Portable Service Stations Mean "Power Lubrication" On the Job!

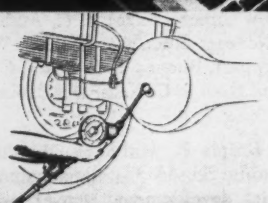
• Less idle time of equipment awaiting lubrication. Fewer parts failures due to improper lubrication. It all adds up to greater profits on every job because machines produce more per day!

Alemite Portable Service Stations provide high pressure power lubrication for all bearings equipped with pressure gun fittings; rapid filling of gear housings, final drives, rear axles, transmissions and crank cases.

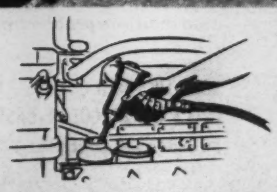
They're used for tire inflation, engine cleaning and paint spraying. The complete unit includes high- and low-pressure Alemite Barrel Pumps, Alemite Oil Dispenser, hose reels and gas engine powered air compressor. And, the savings they make in money, time and machines can make a big difference in your meeting the competition ahead.

FREE! Illustrated catalog describing Alemite Portable Service Stations. Also, complete catalog of individual Alemite lubricating equipment. Send coupon for your copies.





Quick and metered dispensing of gear lubricants to gear housings, transmissions, final drives, etc.



No time or oil wasted in filling crankcases with the amounts desired.

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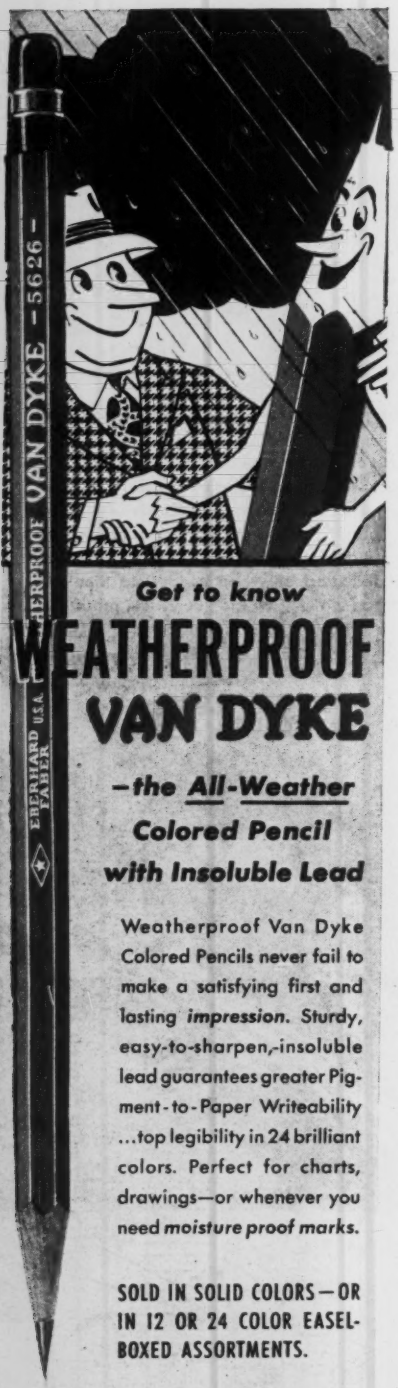

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Elections and Activities

C. V. Isbell, president of the Isbell Construction Co., Inc., Reno, Nev., was elected a national highway director of the Associated General Contractors of America, Inc., by membership from the states of Nevada, California and Arizona recently, represented by the Arizona, Northern California, Central California, Southern California, San Diego and Nevada chapters.

Mr. Isbell, a charter member of the Northern California Contractors, which later affiliated with A.G.C., is a past director of the Northern California chapter and immediate past president of the Nevada chapter.

All officers and directors of the General Contractors and Builders' Association of the East Bay, San Francisco, Calif., have been re-elected. Officers are: C. H. Thomas, president; W. N. Gabriel, vice-president; Harry K. Jensen, secretary-treasurer. Directors include those three and Willis F. Lynn, Frank W. Anderson, Walter Pressler, S. G. Johnson, W. E. Lyons and P. Royal Haulman. M. Anderson was renamed office manager.

F. H. Carlson, Decorah, Ia., has been elected president of the central branch of the Associated General Contractors of America. R. W. Welden, Iowa Falls, and Rudolph Weitz, Des Moines, were elected vice-presidents. J. Leo Hoak, Des Moines, was re-elected treasurer. New directors are: S. C. Andersen, Des Moines; Rudolph Weitz; Walter H. Lippert, Boone; T. L. Sears, Clear Lake, and George C. Koss, Des Moines.

Ralph B. Hubbard, director of the Public Service Co. department of industrial development, Denver, was elected president of the Colorado Society of Engineers recently. Mr. Hubbard succeeds A. F. Hewitt, state highway engineer. Elected vice-president was Dana E. Kepner, Denver, who replaces S. O. Harper, former Bureau of Reclamation official. C. M. Lightburn, assistant chief engineer of the Rio Grande Railroad was re-elected secretary-treasurer. Directors are Mr. Hewitt, C. A. Davis, C. E. Dobbins, John McGowan, Samuel Judd, Paul K. Seyler, R. W. Lindsay, and A. Zulian.

J. G. Wright has been elected president of the Structural Engineers Association of Northern California. A University of California graduate in civil engineering, 1920, Wright has been associated with structural engineers Henry D. Dewell, Knapik and Huber, and Couchot and Rosenwald. He was chief of plans and estimates for the California Exposition Commission for the Golden Gate International Exposition. He is now office engineer for A. W. Earl, consulting engineer.

The Contractors Association of Philadelphia, Pa., has recently elected these officers:

President, Austin Meehan; First Vice-President, Herbert J. Ely; Second Vice-President, Ernest Ventresca; Treasurer, Oscar A. Schilling and Recording Secretary, Lawrence J. Acchione. The directors are: Harry R. Halloran, Raymond B. Featherman, W. Wallace Corson, Francis A. Canuso, Jr., and John B. Megonigle.

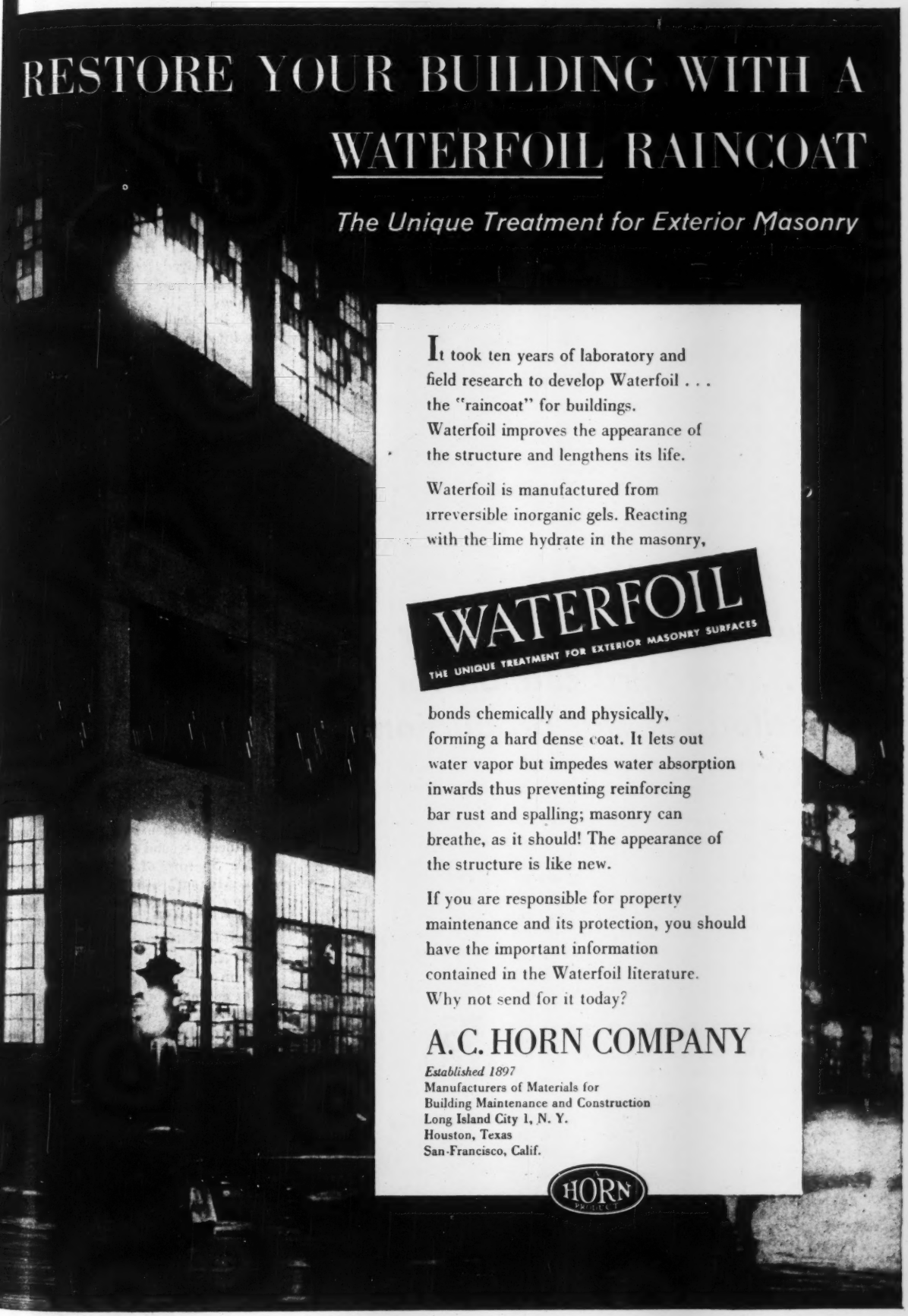
Roy E. Earley has been elected president of the Construction Council at Tacoma, Wash. Alden Woodworth was chosen vice-president; Sam Bergesen, treasurer, and L. B. Macdonald and Robert Ketner, new members of the board.

The Wisconsin Road Builders Association has re-elected the following officers: President, A. E. Bounsall, Kenosha; vice-president, N. M. Isabella, Madison; secretary, C. Pierce, Medford; and executive secretary, E. E. Hoebel, Madison.

The Builders' Association of Kansas City, Mo., recently observed its 58th anniversary. It has a membership of over 300 firms representing the designing branches, general contractors, specialized contractors, fabricators, material dealers and producers.

Forrest F. Dodds

The officers are: Forrest F. Dobbs, President, succeeding Lysle W. Weeks; W. T. Conroy, 1st Vice-President succeeding Forrest F. Dodds; Frank H. Spink, 2nd Vice-President succeeding W. T. Conroy; Paul Jordan, Treasurer succeeding Emil J. Rohrer. Harry G. Palmer, is Secretary-Manager, having served the association as such over a period of years.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WATERFOIL RAINCOAT
The Unique Treatment for Exterior Masonry
It took ten years of laboratory and field research to develop Waterfoil . . . the "raincoat" for buildings. Waterfoil improves the appearance of the structure and lengthens its life.
Waterfoil is manufactured from irreversible inorganic gels. Reacting with the lime hydrate in the masonry,
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THE UNIQUE TREATMENT FOR EXTERIOR MASONRY SURFACES
bonds chemically and physically, forming a hard dense coat. It lets out water vapor but impedes water absorption inwards thus preventing reinforcing bar rust and spalling; masonry can breathe, as it should! The appearance of the structure is like new.
If you are responsible for property maintenance and its protection, you should have the important information contained in the Waterfoil literature. Why not send for it today?
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new WHITE star
. . . our third citation for
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We are happy to display this additional star on our Army-Navy "E" pennant because it is an external symbol of continued excellence in war production and a tribute to our employees for the splendid job they have done. • It is also a reminder — a memorandum to construction men everywhere — that Le Roi Compressors are still going to war and winning laurels on fighting fronts. • However, there is a small percentage of Compressors, Engines and Engine Driven Generators being produced and allocated according to government regulation to those who can qualify as essential users.
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Carroll A. Farwell has been elected president of the Boston Society of Civil Engineers, succeeding Harry P. Burden, dean of engineering, Tufts College, Mass. Mr. Farwell was graduated in civil engineering from the Massachusetts Institute of Technology in 1906. He was employed by the Pennsylvania R. R. at Pittsburgh, then by the U. S. Bureau of Reclamation in North Dakota, Montana, and Washington, D. C.; and after that was with subsidiaries of the Pearson Engineering Corp. in Texas and Spain. In 1915 he joined Fay, Spofford & Thorndike, engineers, Boston, and since 1920 has been a member of that firm, participating in the investigation, design, and construction supervision of bridges, buildings, dams, waterfront structures, airports and other developments and projects including the Boston Army Supply Base, numerous bridges including the highway bridges across the Cape Cod Canal, industrial plants and U. S. Army bases in Newfoundland, Labrador, northern Canada and Greenland.

E. H. Jackson of the Jackson Bayley Electric Co., Canton, Ohio, has been elected president of the Canton regional chapter of the Ohio Society of Professional Engineers and Surveyors. He succeeds Robert A. Weinland of the Union Metal Manufacturing Co., Canton.

Other new officers are A. R. Miller of Union Metal Manufacturing Co., first vice-president; Donald Heffelfinger, Alliance, second vice-president; and C. A. Sperow, of Ohio Public Service Co., Alliance, secretary-treasurer.

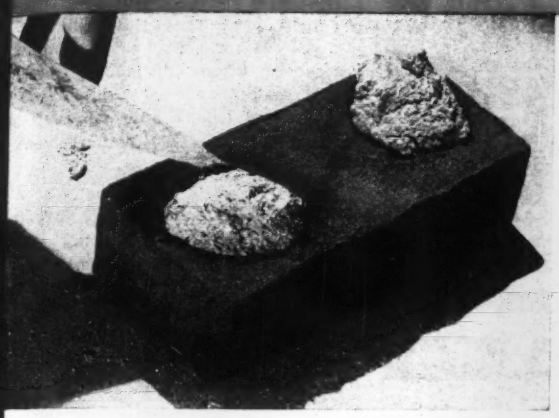
New directors are Charles Wedell, J. M. B. Miskimer, Karl Snyder and Harry Rastetter.

John B. Stirling, vice-president and chief engineer of E. G. M. Cape & Co., engineers and contractors, has been elected chairman of the Montreal branch of the Engineering Institute of Canada. The executive committee consists of: J. A. Beauchemin, vice-chairman; J. J. H. Miller, G. N. Martin, D. Anderson, Lieut. Col. C. C. Lindsay, M. S. Macgillivray, J. Benoit and L. H. Burpee. L. A. Duchastel continues as secretary-treasurer.

Officers of the Association of Professional Engineers of New Brunswick are: A. S. Gunn, Moncton, president; G. M. Brown, St. John, vice-president; Council, R. M. Richardson and C. G. Clark, St. John, and E. C. Percy, Moncton.

BRIXMENT MORTAR

Has Better Water-Retention



Here's the way to test for high water-retention. Slap a small dab of any two mortars onto a brick. Wait a minute, then feel each dab. The one that stays plastic longest will be the one *having the* highest water-retention. *Try this with Brixment mortar!*

—AND HIGH WATER-RETENTION IS ESSENTIAL TO WELL-BONDED, WATERTIGHT MASONRY

Water-retaining capacity is the ability of a mortar to retain its moisture, and hence its plasticity, when spread out on porous brick. ● High water-retaining capacity is of *extreme importance* in mortar. If the mortar does not have high water-retaining capacity, it is too quickly sucked dry by the brick: the mortar stiffens too soon, the brick cannot be properly bedded, and a good bond cannot be obtained.

Brixment mortar has extremely high water-retaining capacity. It strongly resists the sucking action of the brick. Brixment mortar therefore stays smooth and plastic longer, when spread out on the wall. *This permits a more thorough bedding of the brick, and a more complete contact between the brick and the mortar.* The result is a better bond, and hence a stronger and more *water-tight wall.*

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TO ALL CONSTRUCTION SUPTS.:—

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World's Largest Builders of Heavy Duty Air-Cooled Engines

MEN AND JOBS

Edwin E. Corry, head of the New England engineering division, U. S. Army Engineers, and **Benjamin F. Loveland,** recently retired associate engineer of the division, Boston, were recently presented with meritorious emblems and certificates by Col. H. J. Pettit, in honor of 25 years of outstanding civilian service. Mr. Corry was general supervisor of military construction and postwar planning in connection with flood control and river and harbor projects of the New England division office. Mr. Loveland was supervisor of design construction, operation and maintenance of bridges over the Cape Cod Canal, and has lately been engaged in harbor defense work at Boston.

A. P. Black, of the University of Florida, has been retained as consulting engineer for improvement of the water softening system at New Amyrna Beach, Fla. Mr. Black now serves as consulting engineer for a number of water softening plants in Florida.

Tom Ingledow has been named vice-president and chief engineer of the British Columbia Power Corp. and the British Columbia Electric Railway Co., Vancouver, B. C.

Fabian S. Miller, assistant city engineer of Palo Alto, Calif., has been appointed acting city engineer and head of the board of public works for the remainder of the fiscal year, succeeding **L. Harold Anderson,** who resigned to join the California Railroad Commission.

Clarence G. Haynes, a graduate of the North Carolina State College School of Engineering and a draftsman for Olsen and Dietrick Co., Raleigh, consulting engineers, prior to entering the Army Air Corps in 1942, has been promoted to first lieutenant from second lieutenant in England.

Claud O. Davolt, on the county's engineering staff since 1925, has been appointed Cowlitz County road engineer at Longview, Wash. He succeeds **Fred Cramer,** with the department for 28 years, who was given leave of absence because of illness.

Roy Crane, Snohomish County deputy road engineer at Everett, Wash., for the last six years, has been named county engineer to fill the vacancy caused by the resignation of **Clarence**

What makes this Upson-Walton Tackle Block a Better Tackle Block?

IF you insist on getting the best value for your money, you must shop carefully. Whether you're buying a pair of shoes, a locomotive—or a tackle block.

Upson-Walton Tackle Blocks of all sizes are engineered to achieve a well-balanced ratio design between weight and strength—to produce a tackle block that gives the *maximum satisfaction in actual use.* A *better* tackle block—*and a better buy!*

Check this partial list of Upson-Walton specifications before you place your next order for tackle blocks.

COLD ROLLED STEEL center pins provide a smoother surface for the bearing which makes it last longer—gives less friction and more efficient hoisting power.

CLOSE TOLERANCE between sheave bearing and center pin on all Upson-Walton tackle blocks results in longer life for the bearings and a truer-running sheave.

HEAVY SHELL PLATES provide greater protection for sheaves. The block withstands abuse better and rope cannot jam between sheave and shell.

EXTRA HEAVY DROP FORGED connections on all wire rope blocks achieve greater safety, strength and dependability.

HEAVY STRAPS provide greater reserve strength for heavy loads.

ALL SHEAVES are designed with heavy rim and tread sections—rope grooves are long lasting.

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Fuller Transmissions are easy to shift because they were designed and built that way. Easy shifting is not an added accessory; it is a result obtained by the combined contributions of many factors. Weight and speed of the countershaft, leverage on the shifting yokes, mass and size of the individual gears to be shifted—these and many other points must be carefully engineered, separately and together, to make a transmission shift easily. It takes a lot of "know-how."

Fuller has the "know-how" it takes—the experience and data needed to build transmissions that are easy to shift. That knowledge has been effectively used in the present Fuller models—and will be equally effective in making the Fuller Transmission of Tomorrow the kind that drivers like to handle.

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Transmission Division
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Erie builds a complete line of central concrete plants to keep truck mixers on the move.

Consult Erie now for the most modern of Post-war Plants.

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Hickey to become state highway director. Mr. Crane studied engineering at Washington State college and has been with Snohomish County for fifteen years. The new deputy is **Earl Barnwell,** with the department for six years.

Capt. John L. Kemple, for three years resident engineer at the Norfolk Dam project in Arkansas, has been ordered to Fort Belvoir, Va., for assignment. He will be succeeded by **Roy M. House,** who has been his assistant.

W. E. Griffiths, has been named division engineer of the Canadian National Railways, with headquarters at Ottawa, Ont.

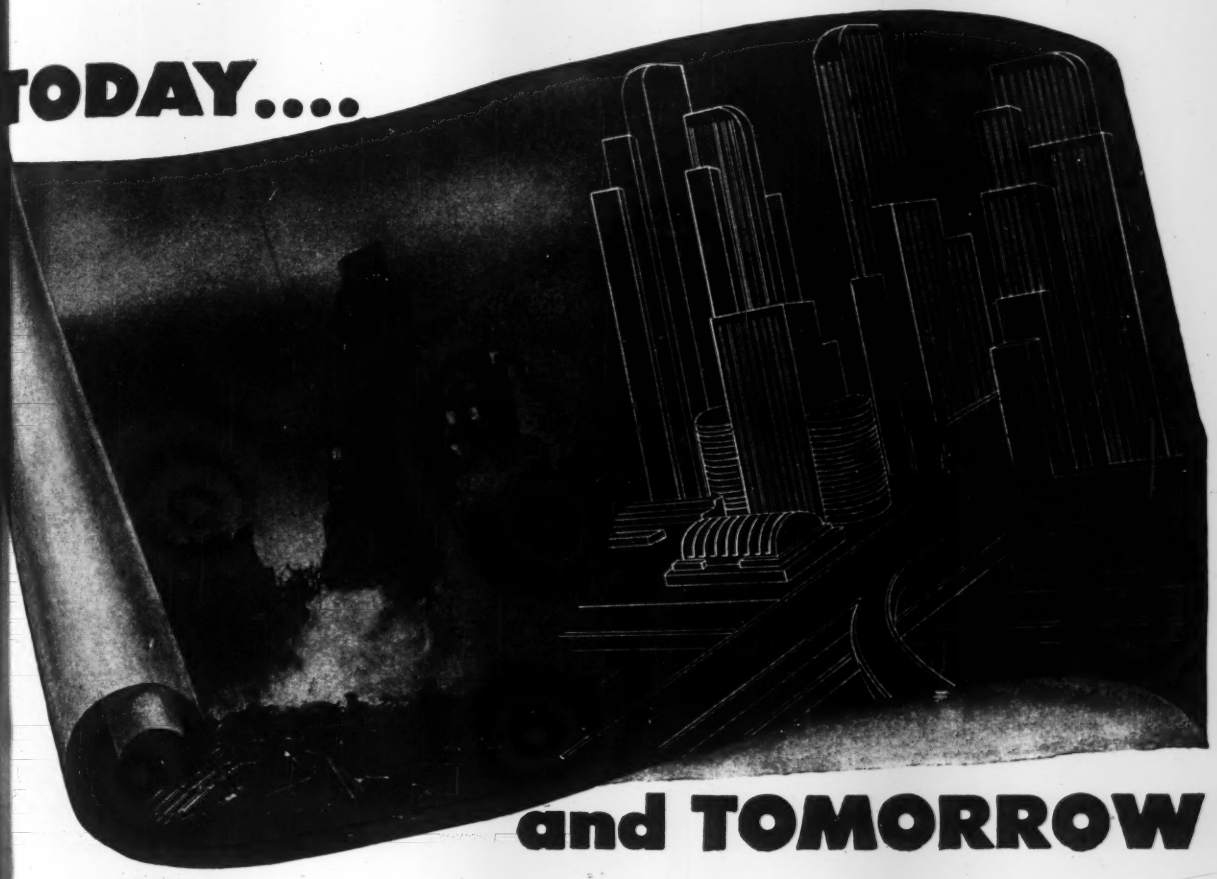
New appointments by Ohio Highway Director Perry T. Ford have been announced as follows:

J. L. McCormick, Ravenna, engineer for Division 4; **Joseph M. Doyle,** Chillicothe, Division 9; and **C. S. Knicely,** Division 10. **Murray D. Shaffer,** Mansfield, has been re-appointed chief engineer of the bureau of location and design, a post he has held since 194[illegible]. **L. F. Schaeublin** has been named chief engineer of the bureau of maintenance. **Fred Swineford,** a former Akron service director, was named chief engineer of the bureau of construction; **Grover C. Snyder** has become engineer of District 6, Delaware; **Maj. Walter A. Burg,** Springfield, has been named engineer of District 7, Sidney; **J. Harmon Wensinger,** former Sandusky County engineer, has been named state highway resident engineer for Sandusky and Seneca counties.

Maj. Rex. J. Allan, former chief of the general engineering branch of the Seattle, Wash., District, U. S. Army Engineers, has been transferred to Camp Beale, Calif. Previously, Major Allan was in Costa Rica for 16 months as chief of th[illegible] San Jose area, Highway. He w[illegible] the California [illegible] for 12 years [illegible] active duty in 1[illegible]

Three officers [illegible] district Army [illegible] ceived orders t[illegible] point not discl[illegible] **Col. William D[illegible]** tive officer; Ca[illegible] bursing officer, **Wheeler,** interr[illegible] **Horace H. Per[illegible]** officer, replacin[illegible] **Capt. Roderick[illegible]** Lieut. Wheeler's duties. **Major Frank C. Ransom** and **Capt. Clayton C. Morse** will assume Capt. Price's duties in addition to their present ones.

TODAY....



and TOMORROW

Now's the time to make plans for your pipelines of morrow . . . and to get down in black and white all those r-deferred municipal improvements and extensions which be started immediately after the war.

In planning water supply lines, it's the duty of every ponsible official to build the sturdiest pressure lines sible. And, the one sure way to do that is to specify ck Joint Reinforced Concrete Pressure Pipe. For many rs, Lock Joint Pipe has been checked and double-cked, proven again and again, even under the most ficult conditions, a safe and sound investment. When talling Reinforced Concrete Pressure Pipelines, here's the performance you can depend upon: LOW FIRST COST . . . LONG LIFE . . . HIGH CAPACITY . . . LOW MAINTENANCE . . . GREAT STRENGTH . . . WATER TIGHTNESS . . . SAFETY.

The extensive use of Lock Joint Concrete Pressure Pipe for important mains in principal cities throughout the country and the constantly growing number of repeat orders is abundant proof of the quality of these tailor-made pipelines.

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Whether your project is large or small, for the present or the future, your 'phone call, telegram, cable or letter to any of our offices will bring a prompt reply.

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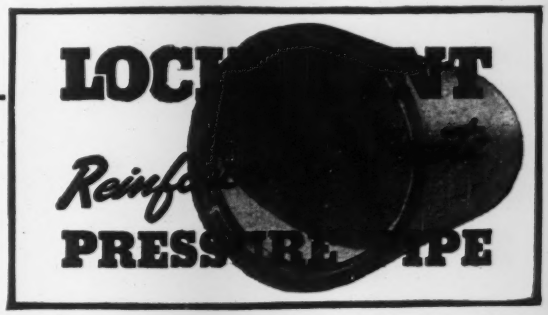

New Aids to the Constructor

Heat-Tempered Glass

Now available in large quantities, a new heat-tempered rolled glass, "Securit," is said to be excellent for uses where severe impact or torsional strain conditions exist. It can also safely withstand sudden and extreme temperature changes, and when destroyed, disintegrates into harmless small particles.

The heat-tempered process produces a light of glass under high tension at the center, while the two outer surfaces are in a high state of compression. It is claimed that the resultant glass is 3 to 7 times as strong as the original untreated glass.—*Blue Ridge Glass Corp., Kingsport, Tenn.*

• • •

Chromate Gasket

Flame- and corrosion-resistant, a new type gasket consists of a felt base impregnated with a chromate pigmented compound. It can also withstand considerable exposure to salt water without decomposition.

A chromate gasket, it is said, will maintain air pressures up to 25 lb. psi. at normal temperatures; it is not affected by fuels and has definite rust-inhibiting properties. Dark green in

color, this gasketing is available in 1/8 and 1/16 in. thicknesses, either factory pre-cut, or to be cut from sheet at point of use, without special tools.—*The Sherwin-Williams Co., Newark, N. J.*

• • •

Ventilated Goggle

Normal breathing makes a natural ventilating pump for a new goggle which cannot cloud up or fog, regardless of how much the wearer perspires. Fitted with a bulbous nosepiece, the goggle is powered by ordinary lung action; normal breathing sweeps a complete change of fresh air in front of the wearer's eyes about once every second, removing moisture before there is enough to condense.

This goggle employs a flow channel to guide air circulation efficiently, and a pump to keep it flowing constantly, under all conditions. The flow channels are built into the goggle frame; the pump is the wearer's lungs. Inhalation draws air through the intake part of the goggle; it then sweeps across the inside of the lens, and passes through an inlet valve into the nose. Exhalation closes the inlet valve and opens the outlet valve in the base of the protruding nosepiece.—*Polaroid Corp., Cambridge 39, Mass.*

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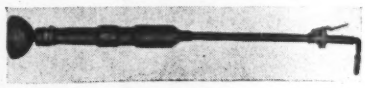
Backfill Tamper

Exceptionally well balanced, a new backfill tamper is said to have smooth



holding characteristics and ease in "walking over" the fill. This ruggedly

SUPER-
Like that of the B-29, Owen superiority is based upon a thorough knowledge of the problem, expert designing and precision manufacturing from the most appropriate materials available.
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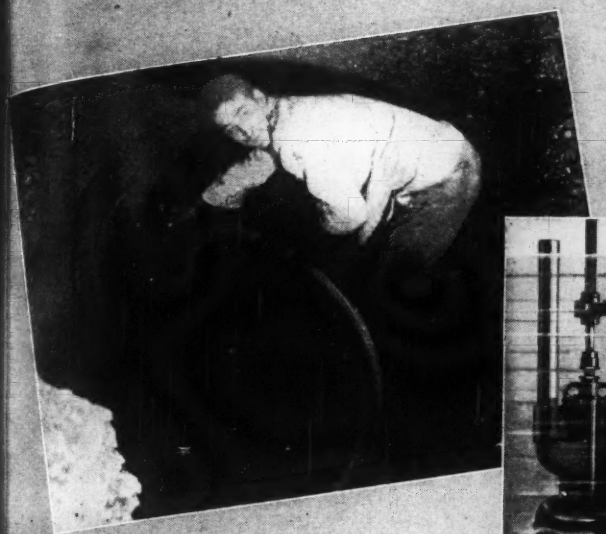
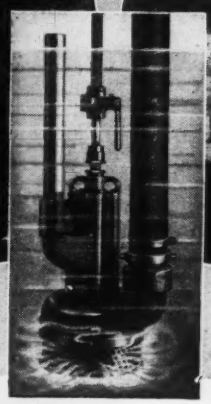
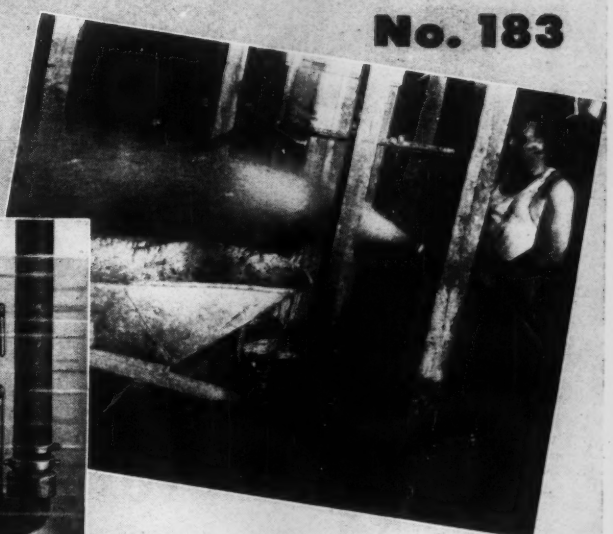
FAST PUMPING with the CLECO-DEMING No. 183



On this job the water dropped so fast that the operator stayed with his valve.





Water gushing from the discharge pump at over 200 gallons per minute.

THIS air operated pump has no equal for the rapid expulsion of liquids from sumps, basements, pools, ship holds, manholes, cofferdams, ditches, etc.

Weighing only 58 lbs., easily portable, the Cleco-Deming sump pump is self-priming, and operates without hesitation when wholly or partially submerged. A screen, easily removed for cleaning, prevents stones or trash from clogging the impeller. All working parts are Cammelite plated to prevent rust. Special design features insure adequate lubrication at all times. For use with oil or gasoline, a bronze body is available at slight extra cost to safeguard against sparks. Write for Bulletin 86.

While the armed services are using Cleco-Deming sump pumps extensively, our production facilities enable us to supply these pumps for commercial use also.

MEASURED CAPACITIES

With Air at 80 lbs. Gage Pressure

Against 10-ft. Head . . . 230 Gals. per Min.
Against 20-ft. Head . . . 218 Gals. per Min.
Against 30-ft. Head . . . 195 Gals. per Min.
Against 40-ft. Head . . . 170 Gals. per Min.
Against 50-ft. Head . . . 145 Gals. per Min.

Maximum Head, 75 Feet

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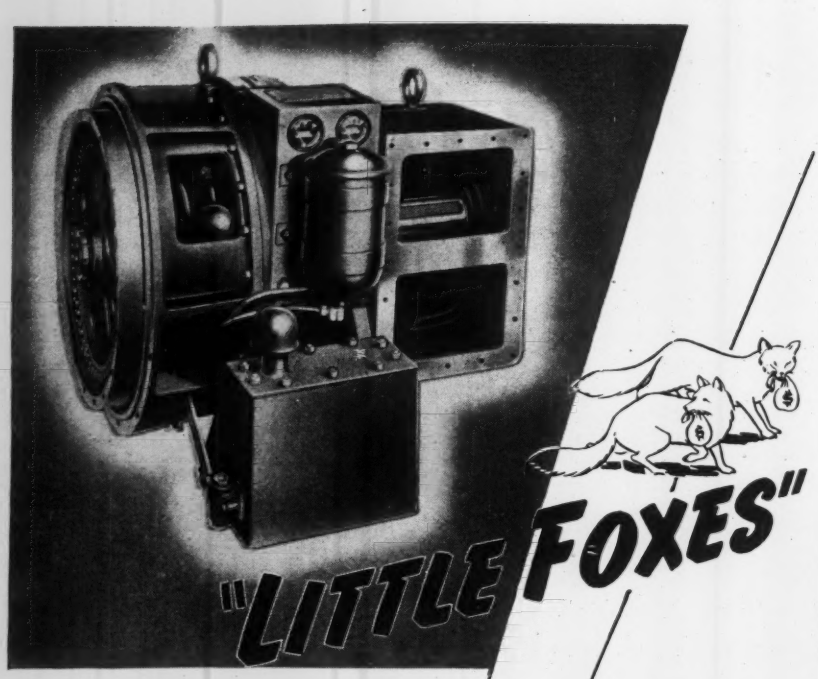
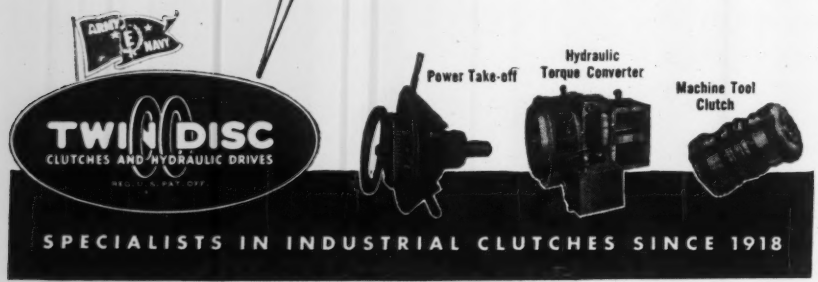
LEADERS IN DRILLING EQUIPMENT



that rob production

Some of the idle moments . . . the "little foxes" that rob production of its maximum attainable high record for total work done . . . can be eliminated with a Twin Disc Torque Converter (Lysholm-Smith Type). For example: The idle moments due to the "bobbing" of the load, which commonly result from brake application, are avoided. By merely throttling his engine, the crane operator holds his load motionless in mid-air or eases it gently and accurately up or down. There's no "bobbing" . . . no jerks on the cables. The result is more work done in a given unit of time . . . less work for the operator. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



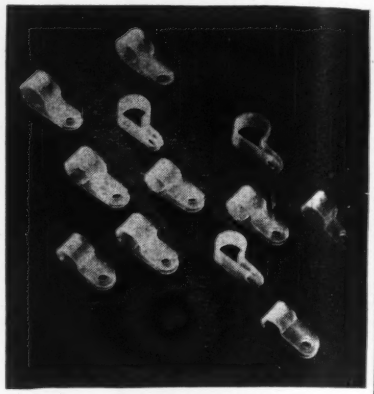
designed and constructed tool is powerful, fast and simple to maintain.

When operated in cold, damp weather, there is no freezing of the tamper valve or exhaust. Piston rod packing and pad attachment are arranged for quick and easy access.—*Gardner-Denver Co., Quincy, Ill.*

• • •

Plastic Cable Clips

The non-corrosive, non-conductive qualities of new plastic cable clips make them valuable in fastening wires, cables and hydraulic lines. These lightweight clips are strong and resistant to acids, alkalies and oil; their rolled edges and the abrasion-free nature of the plastic surface prevent wear-off of



insulating materials. The thermoplastic from which the clips are fabricated, L. T. Ethocel, is said to be tough and shock-resistant, with low dimensional change over a wide range of atmospheric conditions—*Commercial Plastics Co., Midland, Mich.*

• • •

Car Puller

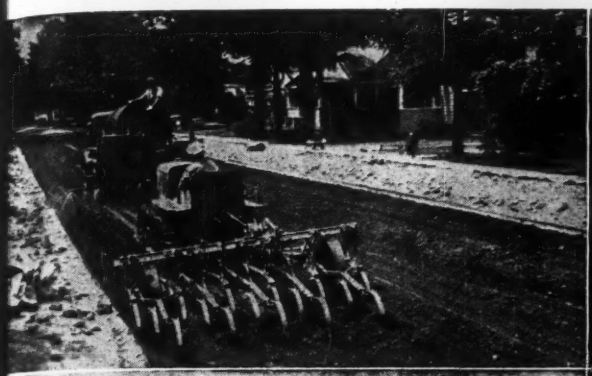
Sturdy and self-contained, the new Model C capstan type car puller gives great efficiency with low horsepower, according to the manufacturer's announcement. All gearing is completely enclosed, as is the electric motor.

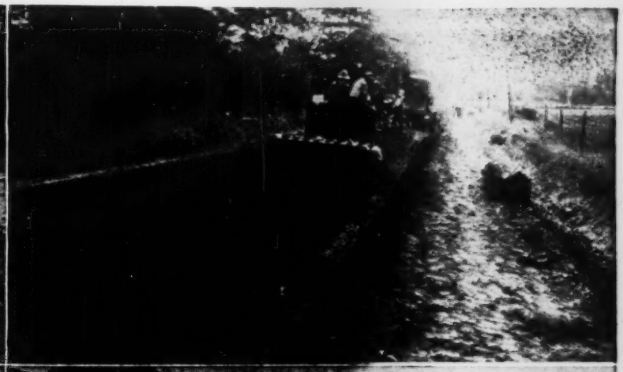
The capstan head is at a convenient height for the operator; the rope can lead in any direction and there are no protruding parts to follow the rope.—*Clyde Iron Works, Inc., Duluth 1, Minn.*

• • •

Cutting Attachment

Increased production is said to result from the continuous movement of a new cutting attachment for use with any of the manufacturer's rotary shears. This cutter is used to cut the arc on cross-cut saws which vary in length from 2½ to 7 ft.—*Whiting Corp., Quickwork Division, Harvey, Ill.*





SOIL-CEMENT SOLVES SPRING BREAK-UP PROBLEMS

...e of several streets in Rome, ... Y. reconstructed with soil-...ment.

...ft. soil-cement shoulders on ... S. Highway 87, near Plain-...w, Texas.

Reconstruction of old rock road near Arthur, Ohio with soil-cement. Project sponsored by Paulding County officials.

Putting finishing touches to newly compacted soil-cement patch which soon will carry traffic.

Severe winters are usually followed by serious Spring break-ups of inadequate roads and streets.

Soil-cement is ideal for salvage, reconstruction, maintenance, widening and shoulder work on gravel, crushed stone and granular-type roads and streets which are damaged by Spring break-ups. Soil-cement meets WPB rulings and the requirement of rigid economy.

Patch maintenance is simple with soil-cement and the patches "stay put."

Four-page illustrated data sheet (No. SCB-6) based on field experience will be mailed to aid engineers in reconstruction and maintenance operations with soil-cement. Free in United States and Canada.

PORTLAND CEMENT ASSOCIATION

Dept. A2b-17, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

BUY AND KEEP MORE WAR BONDS

Manufacturers' Activities

A Leschen & Sons Rope Co., St. Louis, Mo., has announced the appointment of Douglas W. Vernon as general manager of sales. Mr. Vernon is an experienced wire rope man, having been connected with the industry for the past 20 years.

This company, established in 1857, makes wire rope—both preformed and nonpreformed for a wide variety of heavy-duty industrial uses.

A. H. Pilling has been made executive vice-president of Richmond Screw Anchor Co., manufacturers of form tying devices in New York City. Pilling, a graduate in engineering of Rhode Island State College, has been chief engineer of Richmond since 1933, in charge of designing and sales of form specialties. For five years he was with Turner Construction Co. as assistant plant engineer on construction work.

Completion of modernized office space, culminating a 5-year plant rehabilitation program, has been announced by the Barnes Manufacturing Co., Mansfield, Ohio. When M. H. Pryor acquired the company in 1939, he laid out a program to improve manufacturing facilities and capacities.

ANNOUNCEMENT was recently made by A. J. Kerr, general sales manager of Pittsburgh Equitable Meter Co.-Merco Nordstrom Valve Co., of the addition of two service engineers to the firm's New York District Office. These men, William H. Johnson, and George L. Geuss, will handle the sale and service of Pemco and Merco products in sections of the territory under the jurisdiction of M. J. Harper, district manager. The New York office territory comprises most of that state and the state of New Jersey.

W. H. Johnson

Mr. Johnson, a native of New York City, has been connected with the manufacture of water meters and water meter parts for the past 15 years. During that time, he has gained experience not only as a manufacturer of water meters, but from dealing directly with water meter users.

G. L. Geuss

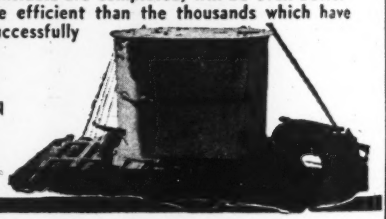
Mr. Geuss has been with the company for several years, covering a part of New York State. In his assignment, he will cover the same area as before, plus some new territory in the state.

GARRETT SUPPLY CO., Los Angeles, Calif., has been appointed Carboloy distributor for the Southern California-Arizona area, according to K. R. Beardslee, vice-president in charge of sales for Carboloy Co., Detroit, Mich., producer of cemented carbide and carbide cutting tools. This supplements direct service of the company's branch in Los Angeles.

SAFE from Invasion is no idle boast today. The enemy has been driven from the Alaskan outposts and they dare not attack us here!
ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

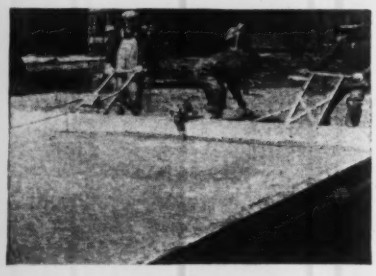
on ROGERS TRAILERS

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be even better-engineered and more efficient than the thousands which have been operated so successfully for many years.



ROGERS BROS. CORPORATION
ALBION,
PENNA.

EXPERIENCE builds 'em PERFORMANCE sells 'em



As a vibrating screed

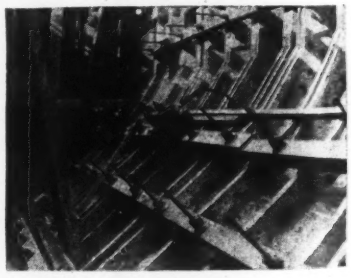
SYNTRON

Pulsating Electromagnet

CONCRETE FORM VIBRATORS

Save Concrete — Speed up Placing and Setting

3600 powerful vibrations per minute
Write for catalog folder



Vibrating wall forms

SYNTRON CO., 328 Lexington Ave., Homer City, Pa.

PERMUTIT SPIRACTOR

★ ★ ★

COLD LIME WATER SOFTENER

THIS interesting equipment is Permutit's latest contribution to better municipal water supplies. The Permutit* Spiractor cuts detention time to as low as five minutes, leaves no sludge to be disposed of. It's simple to operate, economical —makes big savings in steel and in space.

Blue print now for better water in your city. Write for full details to The Permutit Company, Dept.A-12,330 W. 42nd St., New York 18, N. Y. or Permutit Company of Canada, Ltd., Montreal.

*Trademark Reg. U. S. Pat. Off.

PERMUTIT

WATER CONDITIONING HEADQUARTERS

"IT MAKES *Soft water...* IN 5 MINUTES!"

Black on White for Better Sight

WYTEFACE "A" Steel Tapes have *raised* black graduations on a crack-proof white surface. Easy to read in any light, from any angle. Faster measurements with fewer errors. Designed for hard service. White background is protected by raised steel markings and rims. Resists abrasion from rails, pipe, rocks, concrete. Protected against rust. See your dealer. Write for catalog.

K+E

Drafting Reproduction Surveying Equipment and Materials Slide Rules Measuring Tapes

KEUFFEL & ESSER CO.
EST. 1867

NEW YORK • HOBOKEN, N. J.
CHICAGO • DETROIT • ST. LOUIS
SAN FRANCISCO • LOS ANGELES • MONTREAL

WYTEFACE "A"
TRADE MARK
STEEL MEASURING TAPES

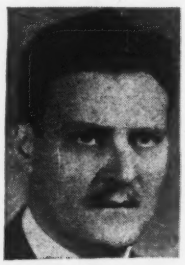
PROMOTION of M. E. Miller from district representative to general sales manager, with offices in Peoria, Ill., has been announced by R. G. LeTourneau, Inc. Mr. Miller joined LeTourneau in 1934 at its Stockton, Calif., office. Between 1937 and 1940 from London he introduced the LeTourneau earthmoving line to many European countries. Since returning from Europe, he has served as a district representative in the southern and southwestern states. He will now supervise the activities of representatives in twenty middle-western states, coordinating with the work of the eastern and western sales managers, all three reporting to G. S. McKenty, general sales manager.

Mr. Miller is succeeding Howard L. Stilley, who becomes manager of the Soule Equipment Co., Oakland, Calif., northern California distributor for LeTourneau.

EDWARD J. CHARLTON, who since 1942 has been assistant to the president of Lukenweld, Inc., has been appointed manager of development engineering, for Lukens Steel Co., and its subsidiaries, By-Products Steel Corp. and Lukenweld, Inc.

Mr. Charlton attended the Drexel Institute of Technology. Upon graduation he joined Shepard Niles Crane and Hoist Co. In 1931 he joined Lukenweld as a designing engineer. In 1940 he became general manager of Lukenweld, Inc.

ECONOMY PUMPS, INC., Hamilton, Ohio, at its recent annual meeting elected the following officers: President, R. H. Thomas; vice-presidents, L. G. L. Thomas, H. R. Ryan, and R. H. Thomas, Jr., treasurer, Lucille V. Thomas; and secretary, Elmer T. Drinkuth.



Elmer T. Drinkuth

John R. Bullock of Taft, Stettinius & Hollister and Elmer T. Drinkuth, controller of Economy Pumps, were added to the board of directors. Mr. Drinkuth was also elected secretary.

Breakdowns COST Money!
Avoid 'Em! Get Done Ahead of Schedule with
VIBER
Concrete Vibrators
Vibers are rugged and FASTER than ever—now 9500 RPM in concrete!
If time counts and breakdowns hurt, switch to dependable VIBER-ation.
Find out about Viber's easy-to-carry size and other exclusive features. Write for catalog.
VIBER COMPANY
726 South Flower Street
BURBANK, CALIFORNIA

IDEAL CHAIN TONGS

For Pipe, Fittings and Flanges

The JAWS have straight teeth for pipe and V shaped teeth for fittings. Drop-forged from special high carbon steel carefully milled, heat-treated and hardened for toughness and lasting qualities. The HANDLES are forged from spring steel heat-treated to give the required stiffness.
The CHAINS are proof-tested.

Write for catalog C-39a for complete showing and description of Armstrong Bros. Pipe Tools.

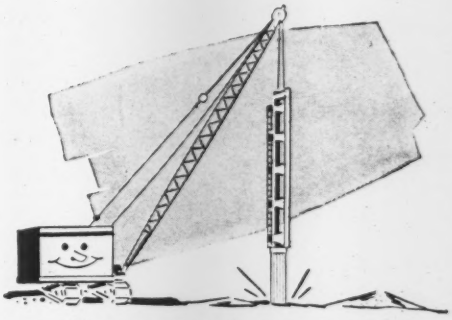
ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
356 N. FRANCISCO AVE CHICAGO, U.S.A.
Eastern Warehouse & Sales, 199 Lafayette St., New York

MONOTUBES

For Highway and Railroad Bridges, Buildings, Marine Construction, etc.

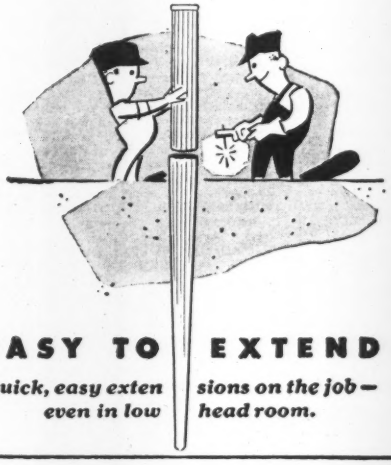
EASY TO HANDLE

Fast, economical handling possible because of their light weight.



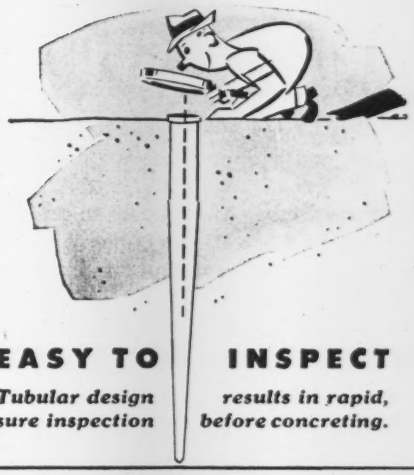
EASY TO DRIVE

Tapered, fluted construction permits faster driving with average job equipment.



EASY TO EXTEND

Quick, easy extensions on the job — even in low head room.



EASY TO INSPECT

Tubular design results in rapid, sure inspection before concreting.

—FIRST IN FOUNDATIONS!

THESE special advantages of Monotube tapered piles have made them time and money-savers on many jobs — large and small—all over the country. If *light weight* plus *strength* plus *fast-driving* plus *integrity* will help you—specify Monotubes the next time you install piled foundations. Available in gauge, size and taper to meet varied requirements. Write The Union Metal Manufacturing Company, Canton 5, Ohio, for free catalog and complete details.

UNION METAL

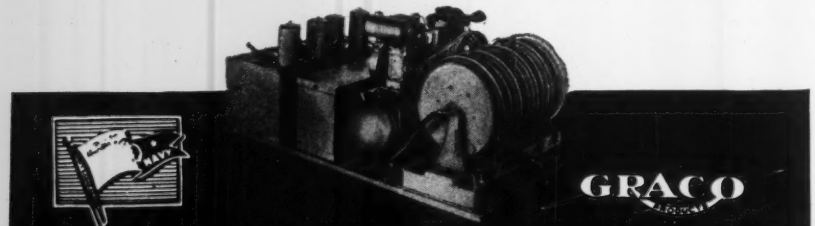
Monotube Tapered Piles

If Shafts, Gears and Bearings could only talk!

● Your machinery always tries to do its work without complaining, but somehow there always comes a time! Give your "ground crew" Graco lubricating equipment and you'll have a lot better chance to keep the wheels flying. Good tools mean a better job of lubricating—less time lost—more production and more profit.

GRACO Convoy Luber—Lubrication is Graco's field. The Convoy Luber is a complete "on the job" unit, ready to serve your equipment anywhere with lubrication, air, light and battery needs. Here's mobile lubrication at its best. Other Graco tools for servicing construction equipment include portable air-operated units, hand operated bucket pump and hand guns for every lubricating purpose.

Keep Machines Fit and Fighting! If your work is essential, you can get what you need to maintain and conserve equipment. Regular pressure lubrication with Graco precision tools means longer life and more work from hard-to-replace parts. Write for Catalog No. 181.



GRAY COMPANY, INC.

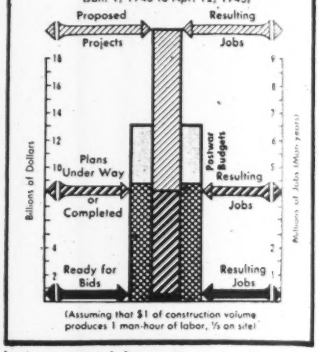
MINNEAPOLIS 13, MINNESOTA

POSTWAR PROJECTS

POSTWAR ENGINEERING CONSTRUCTION VOLUME PROPOSED, PLANS UNDERWAY OR COMPLETED, AND READY FOR BIDS

Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.

(Jan. 1, 1943 to Apr. 12, 1945)


Proposed Projects
Resulting Jobs
Billions of Dollars
Millions of Jobs (Man-years)
Plans Under Way or Completed
Postwar Budgets Resulting Jobs
Ready for Bids
Resulting Jobs
(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

Projects proposed for postwar construction have been published in these columns since January, 1943, as they have been reported to Engineering News-Record.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

If you or your community are working on projects that have not yet been included in this "postwar reservoir," please send us an itemized list and description of them, including estimated cost and the names of the engineers who are at work on the plans. Then as you watch the arrows climb you will know that you and your community are contributing to the success of the NUMBER ONE JOB of preparing for peace.

Address your projects list to Manager Business News Department, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

MINIMUM SIZE OF PROJECTS PUBLISHED

Public Works	$25,000
Industrial Buildings	40,000
All Other Buildings	150,000

WATER SUPPLY

PROPOSED WORK

Calif., Exeter—City, City Hall, constructing street imprvs. **$40,000.**

Calif., Hollister—City, City Hall, $400,000 bond election May 8, domestic water supply, distr. sys. CD 2/20—ENR 3/8.

Ill., Alton—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, water storage tank at Alton State Hospital. $40,000. Financing not provided.

Il., Dixon—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, water sys., at farm colonies, Dixon State Hospital. **$15,000.** Financing not provided.

Ill., Dwight—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, water supply, well and pump. equip., at State Reformatory for Women. **$19,000.** Financing not provided.

Ill., Elgin—Dpt. P. Welfare, Exutive Offices, Springfield, 25 year program, WW addns., at Elgin State Hospital. $325,000. Financing not provided.

Ill., Geneva—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, water storage reservoir, at Training School for Girls. **$25,000.** Financing not provided.

Ill., Jacksonville—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program elevated water storage tank, at Jacksonville State Hospital. **$50,000.** Financing not provided.

Ill., Kankakee—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, elevated water storage and mains, at Kankakee State Hospital. **$50,000.** Financing not provided.

Ill., Lincoln—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, water distr. sys. addns., replacements, at Lincoln State School and Colony. **$25,000.** Financing not provided.

Ill., Menard—Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, 6 in. water main to connect with city water supply. **$103,000.** Financing not provided.

Long Life Liners for Streamliners

Sleek, powerful and modern are the Streamliners as they go streaking through the country on fast schedules and with heavy loads. Their rugged Diesel engines take terrific punishment and take it ably.

Yet there is a spot in these sturdy engines that is vulnerable to wear . . . the cylinder liners. Or rather, the liners are vulnerable to wear *unless they are long life liners treated with* PORUS-KROME . . . as many Diesel engine liners are.

That is why one large manufacturer of Diesel engines for Streamliners and other applications has standardized on PORUS-KROME liners for all engines coming off the production line. And that is why other engine manufacturers are planning to use PORUS-KROME in their engines as soon as they can again build engines for civilian use. It enables them to offer their customers engines of greater reliability and longer life . . . and lower maintenance costs.

And what is PORUS-KROME?

PORUS-KROME is hard, pure chromium which is applied to cylinder bores by the patented Van der Horst process. It has tiny pores and channels in its surface which serve as reservoirs for lubricating oil, feeding it back to the surface as needed. It reduces corrosion and wear and multiplies cylinder life 4 to 20 times, and ring life 3 to 4 times.

Be sure the engines you buy have the greater reliability and lower maintenance costs which are assured by PORUS-KROME. Write today for detailed description of PORUS-KROME and its advantages in gasoline and Diesel engines which are given hard use in commercial and industrial service.

PORUS - KROME

Good for the Life of your Engines

VAN DER HORST

U. S. PATENTS 2,048,578 AND 2,314,604

VAN DER HORST CORPORATION OF AMERICA

AN AFFILIATE OF DRESSER INDUSTRIES

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CLASSIFIER PERFORMANCE QUIZ!

NAME OF CLASSIFIER . . . EAGLE . . .

Q. 1. DOES IT CLASSIFY MATERIALS EFFECTIVELY?

Ans. Yes. Eagle Classifiers are designed to take care of the individual conditions encountered. They are in service today handling materials as fine as 350 mesh. The basic principles necessary for effective settling, classifying and dehydrating—longer tubs, fresh water inlet control, adjustable baffles, etc., are built into every Eagle.

Q. 2. DOES IT DEWATER EFFICIENTLY?

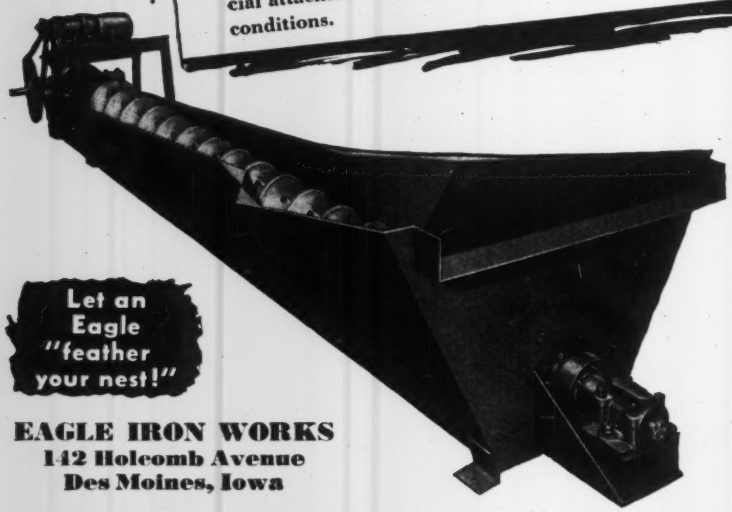
Ans. Yes. The Eagle's longer tub and carefully designed screw permit reduction of moisture content to be controlled to a high degree. When handling material up to 100 mesh, reduction to 9-10% moisture content is possible.

Q. 3. IS IT ECONOMICAL TO MAINTAIN?

Ans. Yes. Interchangeable sectional screw flights permit replacement of lower section (which receives most wear) while upper section is still good. All flights are cast of special, chilled alloy steel with a wearing surface hardness of 600 Brinell. Drive bevels and pinions are precision cut steel gears. Timken roller thrust bearings are used on upper end of screw shafts. Marine type composition bearings are used on the lower end of screw shafts. All materials are selected for efficient performance and long life.

Q. 4. WILL IT DO MY JOB?

Ans. Yes. Eagle Classifiers are made in many different sizes and styles, both single and multiple screw types. Special attachments and adaptations are used to meet unusual conditions.



Let an Eagle "feather your nest!"

EAGLE IRON WORKS
142 Holcomb Avenue
Des Moines, Iowa

EAGLE *Specialized Sand and Gravel Equipment*
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS

EAGLE IRON WORKS
DES MOINES, IOWA
"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

POSTWAR PROJECTS (Cont'd.)

Ill., Normal—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, water supply and distr. sys. addns., at Soldiers and Sailors Children's Home. **$82,000.** Financing not provided.

Ill., Vandalia—Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, steam supply and water sys. **$56,650.** Financing not provided.

Minn., Thief River Falls—City Water & Light Dpt., City Hall, water purification plant with softening, new location for intake, water tower and large main to central distribution. **$100,000.**

Wash., Sedro-Woolley—State Dpt. Finance, Social Security Bldg., Olympia, water supply sys. for Northern State Hospital. **$100,000.** Financing provided. CD 3/2—ENR 3/22.

PLANS UNDER WAY

Calif., Antioch—City, City Hall, plans under way filtration plant, for Water Dpt. Over **$15,000.** J. S. Bates, 3134 Etna Ave., Berkeley, consult. engr.

Calif., Lodi—City, City Hall, plans under way replacements and addns. to water and electric plants. **$55,000.** Funds available. C. L. White, City Hall, city engr. CD 3/31/43—ENR 9/2/43.

★**Ill., Chicago**—Dpt. P. Wks., City Hall, plans under way Springfield Ave. Pump. Station, enlargement providing greater pump. capacity, completely rehabilitate boiler plant, new pump. unit, **$1,100,000** incl. equip.; Central Park Ave. Pump. Station, addn. of pump. equip., and constructing boiler water treatment plant providing larger capacity and to protect boilers with suitable treated water, **$570,000;** plans Roseland Pump. Station, reconstructing boiler plant, involving boilers and all auxiliary equip., providing adequate, reliable source of steam for driving supply pumps, **$800,000.** W. W. de Berard, City Hall, city engr. O. B. Carlisle, City Hall, engr. Waterworks Design.

Ill., East Moline—Dpt. P. Welfare, Executive Offices, Springfield, plans under way 25 year program, water filtration plant and storage tank, at East Moline State Hospital. **$245,000.** Financing not provided.

Mich., Pontiac—City, City Hall, plans under way rehabilitation water purification plant for city water sys. **$250,000.** Jones & Henry, Toledo Trust Bldg., Toledo, O., consult. engrs.

Okla., Mangum—City, City Hall, plans 50% completed exten., enlarging city light plant and WW sys. **$100,000.** Bonds voted. Alexander & Pollard, Terminal Bldg., Oklahoma City, consult. engrs. CD 2/21—ENR 3/8.

Ore., Portland—Westslope Water Dist., 9025 S. W. Canyon Rd., plans under way 2 reservoirs, one 500,000 gal. and other 100,000 gal. capacity. **$25,000.** Financing not provided. Cunningham & Associates, Spalding Bldg., consult. engrs.

Tex., Harlingen—Central Power & Light Co., 120 W. Jackson St., plans 50% completed increasing capacity of water plant by 1,400,000 gal., **$16,000;** WW imprvs., new aeration unit, pump. unit and intake, **$60,000;** increasing reservoir capacity, **$35,000.** Financing provided. A. Tamm, 107 S. 1 St., consult. engr. CD 3/14—ENR 4/5.

Tex., Lubbock—City, City Hall, distr. sys. exten., approx. 14 in. belt line and addn. elevated storage, **$150,000.** A. L. King, City Hall, city engr.

Tex., McAllen—City, F. E. Osborn, mayor, City Hall, imprv., exten. water and power sys, **$117,000.** Financing provided. A. Tamm, Harlingen, consult. engr.

Tex., Mission—City, City Hall, voted **$170,000** bonds, WW imprvs., incl. 500,000 gal. elevated storage tank, enlarging storage reservoir, pump. plant and filtration, distr. lines. H. H. Ewing, Mission, consult. engr. 3/12—ENR 3/22.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Atherton—City, City Hall, sewer construction, **$70,000.** Financing not provided.

Calif., Visalia—City, City Hall, exten. sewers, imprvs. storm drains, **$52,000.**

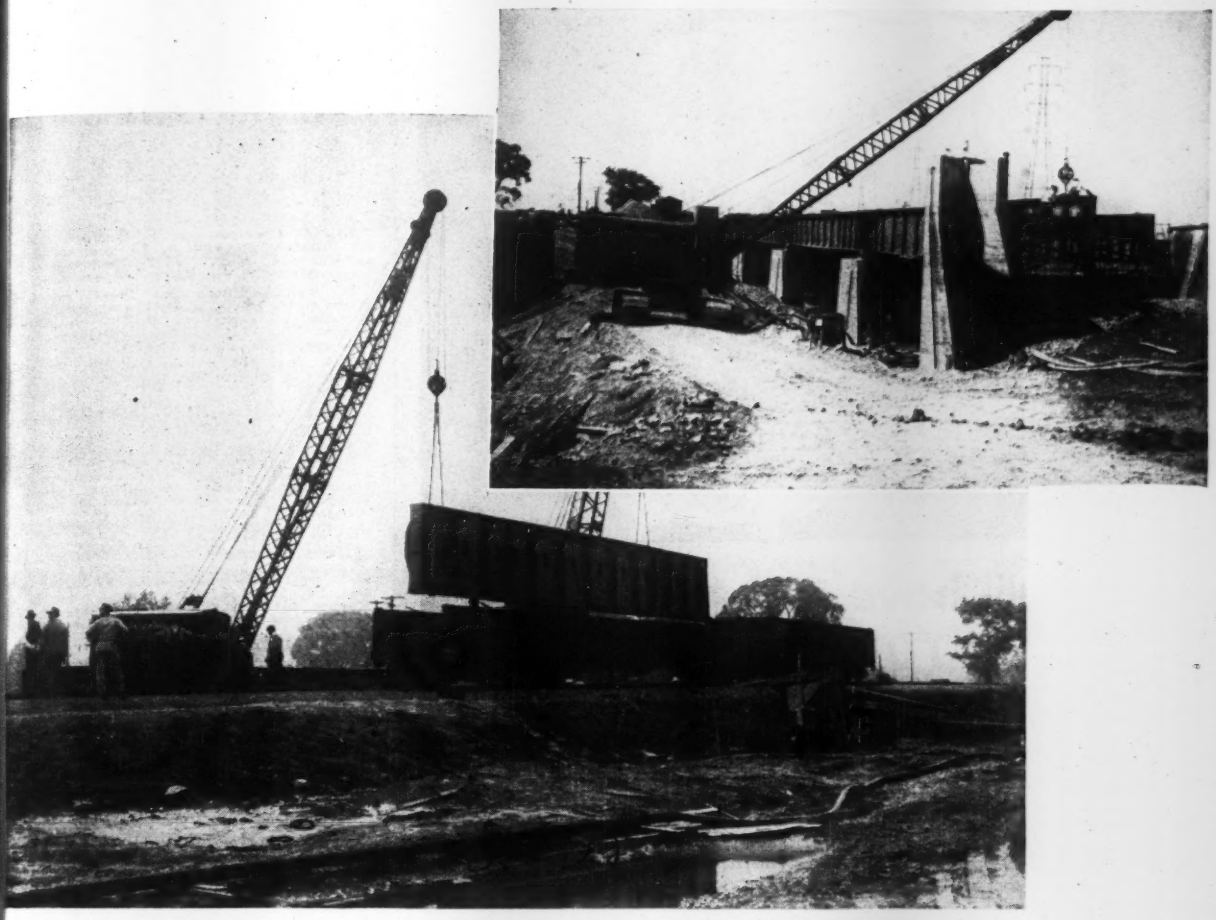
Ill., Alton—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, garbage incinerator. **$30,000;** sewage treatment plant addn., **$30,000** at Alton State Hospital. Financing not provided.

Ill., Dixon—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, sewage disposal plant, sewers at Dixon State Hospital, **$30,000.** Financing not provided.

Ill., Elgin—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, incinerator at Elgin State Hospital. **$50,000.** Financing not provided.

Ill., Jacksonville—Dpt. P. Welfare, Executive Offices., Springfield, 25 year program, sewers, at Illinois School for Blind. **$27,000.** Financing not provided.

Ill., Joliet—Div. State Fair, State Fair Grounds, Springfield, 25 year program, 3,500 ft. 4 in. sewer and connecting sewers, **$154,500.** Financing not provided.



It is only natural to find

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12 Sizes
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Also truck mounted shovels and cranes

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With the coming of peace and a return to the American way of producing goods at a profit in highly competitive consumer markets you'll *have* to be certain that every step from initial blueprint and tool design, through the machining, stamping and assembly line, up to packaging and delivery is planned and executed with utmost efficiency and with the minimum of cost.

In the production of war munitions Oiljak has maintained an enviable record of production of intricate parts and on time deliveries, in accordance with strict Government inspection—and has actually reduced the estimated and approved cost, thus saving the Government considerable sums, by skillful planning and supervision of the work. These same skills in metal manufacturing, improving designs and reducing costs are available to manufacturers as they convert to peacetime merchandise. It may transmit your penny savings into dollar profits to confer with us on any metal manufacturing problem.

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THE JOB COMPLETE . . .
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POSTWAR PROJECTS (Cont'd.)

Ill., Kankakee—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, replacing sewers, **$100,000;** incinerator, $30,000, at Kankakee State Hospital. Financing not provided.

Ill., Manteno—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, replacing and sewerage sys. addns., **$60,000;** sewage treatment plant addns., **$150,000,** at Manteno State Hospital. Financing not provided.

Ill., Peoria—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, sewerage sys. addn., Peoria State Hospital, **$80,000.** Financing not provided.

Ill., St. Charles—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, sewerage sys. addns., at Training School for Boys, **$44,800.** Financing not provided.

O., Toledo—Lucas Co., Toledo, 4,500 ft. storm water sewer to drain area surrounding proposed state-constructed grade separation at New York Central R. R. crossing in Reynolds Rd., near here, **$75,000.**

Tex., Pleasant Grove (R. Sta. Dallas)—Dallas Co. Water Control & Imprvt. Dist. 1, c/o J. Simms, 9-22 N. Buckner St., Dallas, plans bond election soon, sewage disposal plant, **$40,000;** new sewerage sys., $100,000. Financing not provided.

Wis., Fond du Lac—City, G. J. Ondrosek, clk, City Hall, imprv. sewage treatment plant, addnl. digester, grit chamber, machinery, 2 screens, recondition pumps, 2 pumps, chimney, **$80,000.** Financing not provided. CD 3/4/43—ENR 3/11/43.

PLANS UNDER WAY

★**Calif., Arcadia**—City, City Hall, preliminary plans under way sanitary sewerage sys., treatment plant, etc., **$750,000,** bond election May 8 for same. Koebig & Koebig, 458 S. Spring St., Los Angeles, consult. engrs. CD 11/1—ENR 11/9 under Sewers.

Calif., Davis—City, City Hall, plans 250,000 completed sewage treatment plant, extend sewerage sys. on site 3 mi. northeast of here. **$100,000.** Site purchased. C. Gilman Hyde, 2599 Buena Vista St., Berkeley, consult. sanitary engr. A. D. Coons, Davis, city engr. CD 9/8—ENR 9/21.

Calif., Lodi—City, City Hall, plans underway sewage and industrial waste disposal plant, incl. 6-mile outfall line, **$500,000.** Financing not provided; 1.5 mi. storm and drainage line, **$45,000.** Financing available. C. L. White, City Hall, city engr. CD 5/31—ENR 6/1.

★**Calif., Los Angeles**—City, City Hall, voted $10,000,000 bonds, sewage disposal plant at Hyperion, **$21,000,000** or more. L. E. Aldrich, City Hall, city engr. CD 2/14—ENR 3/8.

★**Calif., Napa**—City and Napa Co., City Hall, sewage disposal sys., incl. intercepting sewer lines, pump. plants, river crossing and sewage works, **$1,000,000.** H. N. Jencks, 345 Madrono Ave., Palo Alto, consult. sanitary engr.

Calif., Oroville—City, City Hall, plans 250,000 completed storm sewer work. **$43,000.** S. J. Norris, City Hall, city engr. CD 1/31.—ENR 2/22.

Conn., Fairfield—Town, F. S. Shaw, chm. Com., Mill Hill, Fairfield, plans completed incinerator and garage, off Reed Rd., Wakeman Island. **$300,000.** Financing not provided. Keis & Holroyd, 257 Bway., Troy, consult. engrs. CD 1/17—ENR 2/8.

Ill., Chicago—City Dpt. P. Wks., Div. Sewers, City Hall, 130 St. Pump. Station, Calumet River to pump storm water run off at proposed 130 St. sewerage sys. **$400,000.** Financing not provided. W. W. DeBerard, City Hall, city engr. H. M. Forrey, chief engr. Bureau of Sewers. T. D. Garry, supt. Bureau of Sewers.

★**Ill., Chicago**—Sanitary Dist. of Chicago, 910 S. Michigan Ave., plans under way West-Southwest Treatment Works, pump and blower house, sludge disposal bldg. exten., **$3,490,000;** Southside Sewers, 13 mi. intercepting sewers in 28 mi. sq. area, **$16,000,000.** Bonds to be sold. W. H. Trinkaus, c/o owner, engr.

★**Ill., Chicago**—Sanitary Dist. of Chicago, 910 S. Michigan Ave., plans under way West-Southwest Sewage Treatment Works aeration and final settling tanks, Battery 1, for addnl. sewage treatment capacity, 1 complete battery of 8 aeration tanks and 2 final settling tanks with appurtenant structures, **$3,728,000;** West-Southwest Sewage treatment works, near Pershing Rd. and 39 St., addnl. sewage treatment and sludge disposal capacity involving appurtenant structures and work necessary to complete works, **$951,000;** Calumet Sewage Treatment Works addnl. sludge drying capacity, increasing mechanical equip. necessitated by increasing solid load tributary to plant, **$250,000;** plans nearing completion Sewage Pump. station, 95 St. and Baltimore Ave. and at Pershing Rd. and Racine Ave., providing addnl. pump capacity, replacing existing pumps and enlarge Racine Station through installation of 4 more big pumps and extend. bldg., work at 95 St. and Baltimore Ave. incl. revision to electric equip. and structural steel alterations, **$1,245,000;** designs well advanced Northside Sewage Treatment works, Howard

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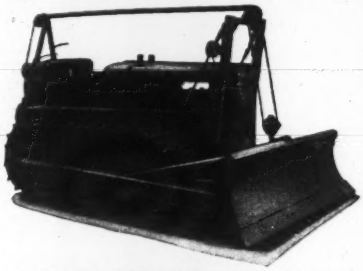
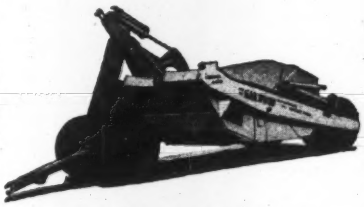
STAYS ON THE JOB

GAR WOOD GW ROAD MACHINERY TRADE MARK



CABLE DOZECASTERS with angling blade for Allis-Chalmers HD-10 and HD-14 Tractors



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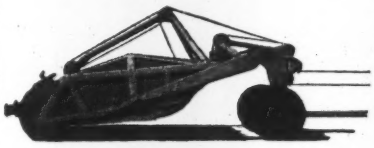
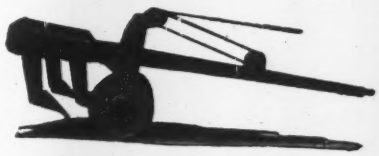
Capacities: 8-10-15 cu. yds.

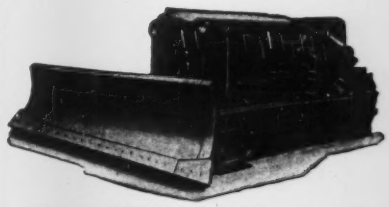
Gar Wood Industries, Inc., manufactures a complete line of heavy-duty earth-moving machinery • • • 2-wheel Scrapers, 4-wheel Scrapers, Bulldozers, Roadbuilders, Dozecasters, Rippers, Tamping Rollers and Cable Control Units. When anticipating your earth-moving equipment needs, be sure to investigate this modern well-constructed line. Your Allis-Chalmers Industrial Tractor Dealer will be happy to point out the features that make Gar Wood Road Machinery outstanding in the earth-moving equipment field. Get the maximum in performance with a minimum of "down time" • • • buy *GAR WOOD.*



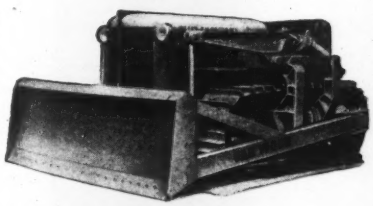
4-WHEEL CABLE SCRAPERS
Capacities: 11-15-20-25 cu. yds.



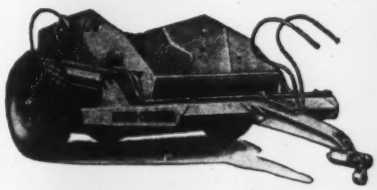
HEAVY DUTY RIPPERS
Cable and hydraulic operation



HYDRAULIC ROADBUILDERS with angling blade. For all Allis-Chalmers Tractors

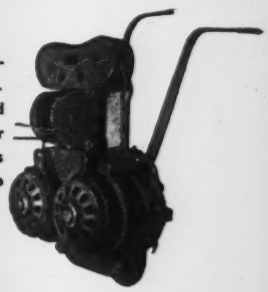


HYDRAULIC BULLDOZERS with fixed blade. For all Allis-Chalmers Tractors



2-WHEEL HYDRAULIC SCRAPERS
Capacities: 3-5-6-8 cu. yds.

CABLE CONTROL UNITS. Double and single drum for 'most all makes of track-type tractors



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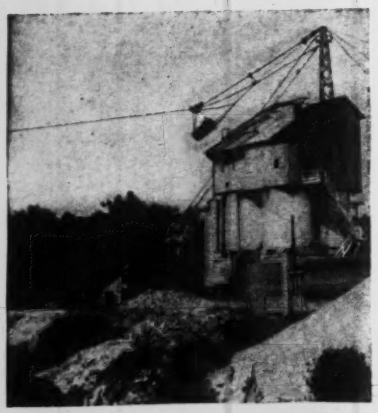

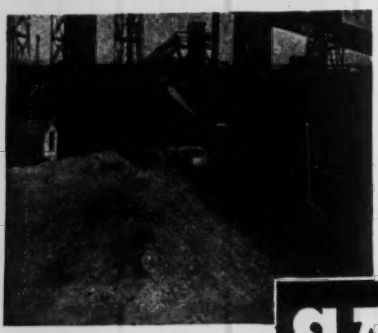

(Upper View) Sauerman Slackline Cableway moving gravel from wet pit to screening plant. (Lower View) Sauerman Scraper reclaiming crushed rock from stockpile.

SLASH COSTS
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Ask any operator of a Sauerman Scraper or Cableway and he will tell you this is, in most cases, the cheapest way to move materials from pit, pond, hill or stockpile.

These machines dig, haul and dump automatically in one operation and are adaptable to a great variety of ground conditions.

Because they need only a single operator, consume little power in operation, and are easy to keep in good running order, they cut costs to the bone.

Sauerman engineers will gladly study your digging or stockpiling problems. Their advice may save you money and will be given free. Write for our catalog and tell us about your problems.

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Compact! Powerful! Safe!

DISTRIBUTABLE CONTROLLED POWER

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Money Has Been Saved on These Jobs

1200' assembled pipe (132 Tons) were lowered to bed of Mississippi at St. Paul with 9—5-Ton Beebes, three lines to each hoist through blocks.

Hudson River Bridge sidewalks were laid in sections with 32—5-Ton Beebes.

22 Beebe hoists raised, held and controlled one of world's largest tents over Mud Mountain Dam in Washington State.

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When raising, lowering, or placing costs by power are a serious problem, the answer is the right number of Beebe Bros. All Steel Hand Hoists MANNED IN UNISON. Available in 2, 5 and 15 Ton sizes. Sold through leading dealers in all trade centers. List of dealers sent upon request.

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LEESBURG, NEW JERSEY

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POSTWAR PROJECTS (Cont'd.)

Ave. and McCormick Rd., preliminary treatment, imprvs. and hydraulic air compressor, **$140,000.** Financing available. W. H. Firkasus, 910 S. Michigan Ave., Chicago, engr. Sanitary Dist.

★**Ill., Normal and Bloomington**—Bloomington & Normal Sanitary Dist., Normal, City Hall, plans under way repairing drainage sys. for Bloomington and Normal Sanitary Dists., repair creeks to carry extra storm water, **$680,000** bonds voted. J. J. Woltman, 315 Unity Bldg., Bloomington, consult. engr. CD 3/15—ENR 4/5.

Ill., Silvis—City, City Hall, sewage treatment plant. **$60,000.** A. R. Boudinot, 2639 5 Ave., Moline, acting city engr.

Ind., Rushville—City Council, M. Abercromble, mayor, C. Berry, clk., City Hall, sewage treatment plant. **$100,000.** P. White, Muncie, consult. engr. CD 1/22—ENR 2/8.

Ia., Prairie City—City, City Hall, E. Van Haalen, clk., sewerage sys. **$78,000.** Currie Eng. Co., Webster City, engrs.

Mo., Cabool—City, J. Lindsey, mayor, City Hall, plans under way sewerage sys. **$30,000.** Russell & Axon, 4903 Delmar St., St. Louis, engrs.

Okla., Oklahoma City—City, City Hall, E. Simon, clk., plans 10% completed addns. to and exten. North Side Sewage Disposal Plant, **$75,000;** addns. to and exten. South Side Sewage Disposal Plant, **$100,000.** Land rights not cleared, financing not provided. M. B. Cunningham, City Hall, engr.

Tex., Gonzales—City, City Hall, plans 50% completed sewage disposal plant. **$60,000.** Financing provided. Garrett Engineering Co., 1806 Milam St., Houston, consult. engr. CD 2/16—ENR 2/22.

Tex., Mission—City, City Hall, voted **$80,000** bonds sanitary sewerage sys. imprvs., incl. collection lines, increase pump. capacity, enlarge disposal etc. H. H. Ewing, Mission, engr. CD 12/14—ENR 12/22.

★**Va., Arlington** — Arlington Co., Court House, Arlington, two 150 ton incinerator units, **$350,000;** plans completed storm sewerage sys. serving one of large drainage areas, using concrete pipe and concrete culverts, **$1,282,000.** Financing not provided. Chester Engineers, 210 E. Parkway at Sandusky, Phila., Pa., consult. engrs. C. L. Kinnier, Court House, co. engr. for both projects.

★**Wash., Spokane**—City, City Hall, sewage disposal plant with 9 mi. sewer. **$2,627,437.** Financing not provided. E. S. Butler, City Hall, city engr. CD 9/9/43—ENR 9/16/43.

Wis., Plain—Village, L. Bettinger, clk., sewage treatment plant, sewers. **$40,000.** Financing not provided. General Engrg. Co., Portage, consult. engrs.

READY FOR BIDS

★**Fla., Tampa**—City of Tampa and Hillsborough Co., Tampa, plans completed sewerage sys. covering 120 sq. mi. of city and addnl. 100 sq. mi. surrounding territory in Hillsborough Co. **$8,699,028.** Financing available. W. L. Harwell, City Hall, city engr. **(Correction**—engineers name.) CD 2/14—ENR 3/8.

Ready for Bids

Of $17,000,000,000 of proposed postwar construction at beginning of 1915 only $550,000,000 was reported "ready for bids", plans complete and financing available.

If you have projects "ready for bids", please send them in to be added to the total above to give a measure of the materials that will be needed to relax restrictions and go ahead with civilian work.

Send ready-for-bids projects news to Elsie Eaves, Manager Business News Department, Engineering News-Record, 330 W. 42 St., New York 18, N. Y.

BRIDGES

PLANS UNDER WAY

Ill., DeKalb—Dpt. Registration & Educ., Executive Offices, Springfield, 25 year program, Kishwaukee River Bridge, at Northern Illinois State Teachers College. **$42,436.**

Maine—State Hy. Dpt., 1 Cony St., Augusta, plans under way concrete, steel bridge over St. John's River, at Dickey. To exceed **$25,000.**

Mass., Fitchburg—City Dpt. P. Wks., City Hall, rein.-con. bridge at airport. **$25,000.** Financing not provided.

New Hampshire—State, Concord, bridge over Merrimack River, between Nashua and Manchester at Reed's Ferry. **$250,000.** Land rights not cleared, legal obstacles to be overcome, financing not provided.

PROPOSED WORK

★**Ill., Chicago**—City, Dpt. P. Wks., Div. Bridges and Viaducts, City Hall, S. Michigan-S. Wabash, S. Chicago Ave. and Vincennes sys. of viaducts joining S. Chicago Ave., Vincennes and Michigan and trunk line to link Wabash, **$5,500,000;** preliminary

Dipped in Molten Zinc

FOR THE UTMOST IN RUST PREVENTION

"I predict that the most certain major changes in greenhouse construction will be the universal use of Hot-Dip Galvanizing to prevent the need of maintenance."

T. E. KING, *Vice President*
LORD & BURNHAM COMPANY

Two examples of steel constructed greenhouses by Lord & Burnham Co., Designers and Builders of Greenhouses since 1856 . . . Hot-Dipped Galvanized throughout for protection from weather and condensation.

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If the life of your products is menaced by corrosion—here is the solution to your problem. Conclusive tests have proved that Hot-Dip Galvanizing provides *the utmost in rust prevention.*

There is a member of the Hot-Dip Galvanizers Association near you who will be glad to discuss rust and corrosion prevention—for his name and address write: American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh 22, Pennsylvania.

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Why This Water-Well Casing SAVES TIME, CUTS COSTS

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1. **Choice of Wall Thickness.** You can choose the correct wall thickness from 3/16 to 1/2-inch.

2. **Specified or Cut Lengths.** Reduce number of field joints by ordering to length to fit the height of rig or head room.

3. **Perfect Line-Ups.** Square-cut ends and collars mean perfect line-ups for your well casing.

4. **Resistance to Collapse.** The spiral weld construction imparts stiffness and resistance to collapse — helps assure straightness when casing is set.

5. **Faster Field Work.** Derrick work is speeded. Special line-up clamps are not needed.

Try ARMCO Spiral Welded Casing on your next job. It meets wartime demands for speed and efficiency. Write for information. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 1351 Curtis Street, Middletown, Ohio.

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POSTWAR PROJECTS (Cont'd.)

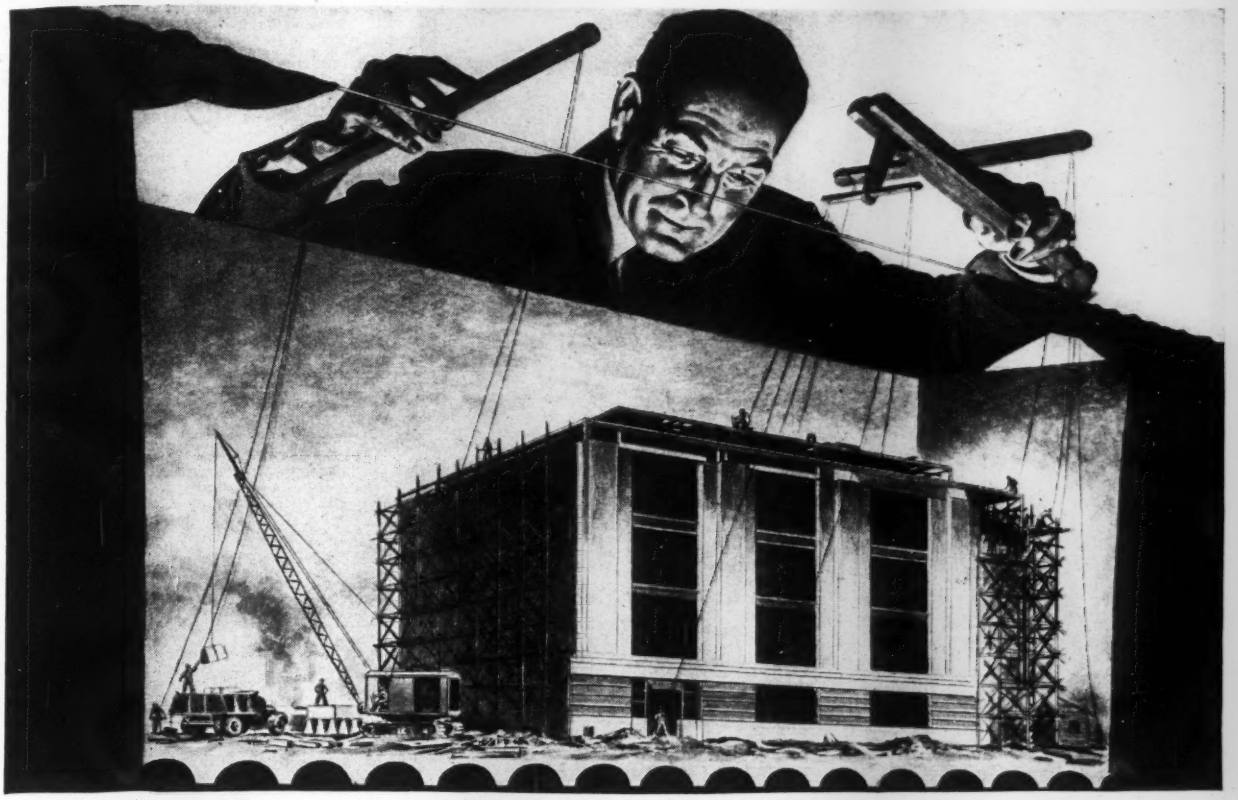
plans under way E. 106 St. Viadu[ct] 4-lane at 106 St. and Torrence, grade cross[ing] elimination, **$900,000.** Financing not provided. W. W. DeBerard, City Hall, city engr. S. Michuda, City Hall, engr. Bridges and Viaducts.

★**Ill., Chicago**—City Dpt. P. Wks., City Hall, preliminary plans under way W. 18 St. Bridge and Viaduct, double leaf bascule, steel, 44 ft. roadway, $2,000,000; S. Throop St. Bridge and viaduct, bridge now at S. Throop St. plan to build new one at Racine, double leaf bascule, steel, $1,200,000; W. Erie St. Viaduct, steel, $400,000; N. Clark St. Viaduct, steel, **$100,000.** Financing not provided. W. W. DeBerard, City Hall, city engr. S. Michuda, City Hall, engr. Bridges & Viaducts.

★**Ill., Chicago**—City, Dpt. P. Wks., Div. Special Imprvs., 139 N. Clark St., preliminary plans under way underpass N. Central, opening street from W. Cornelia Ave. to W. Addison, **$360,000,** $10,000 authorized; steel, rein.-con. underpass, N. Western Ave. and Logan Blvd., **$900,000,** $5,000 authorized; underpass in S. State St. at 63 St., reconstruction, obstructions to be removed and widening roadway, **$1,700,000;** Passerelle pedestrian overpass, E. 95 St., and S. Woodlawn Ave., elimination pedestrian grade crossing, **$30,000;** grade separation, Elston Ave. to city limits, eliminate 3 grade crossings and 2 obstructions with grade separations, **$3,799,000,** all foregoing no funds authorized, A. Engh, engr. Div. Special Imprvts.; W. North Ave. Bridge and viaduct, new steel bridge with up to around 44 ft. roadway with viaduct over railroad tracks, **$1,700,000;** N. Western Ave. bridge, **$1,600,000;** S. Clark St. viaduct, steel, double deck, **$2,500,000,** S. Michuda, City Hall, bridge and viaduct engr. W. W. DeBerard, City Hall, city engr.

★**Ill., Chicago**—City, Dpt. P. Wks., Div. Special Imprvs., 139 N. Clark St., preliminary plans completed, contract plans under way grade separations, Grand Trunk Western R.R., S. Central Park from W. 51 to W. 57 Sts., track elevation, eliminate grade crossing at 51 and W. 55 Sts. later open to St., **$3,000,000;** ($25,000 authorized for engineering); preliminary plans under way underpass, S. Austin, Central and Laramie near Harrison, elevating railroad tracks, eliminating grade crossing, **$20,000** authorized; underpass in E. 83 St. under D.F.W. & C. Ry. and N.Y.C. construction between Anthony Ave. and S. Chicago Ave., street opening, **$750,000,** $10,000 authorized; contract plans 95% completed underpass N. Lincoln and W. Addison, under C. & N.W. Ry., reconstruction, avoiding obstructing columns, **$519,000,** $217,790 authorized; contract plans 90% completed underpass in E. 83 St., near Ellis Ave. under N.Y.C. and St. L. & I. Railroads, construction, opening of thoroughfare, **$865,000,** $482,000 authorized; contract plans 80% completed underpass in Laramie Ave., Bloomingdale Rd. to W. Grand Ave. under C.M., St. P. & P.R.R., construction, opening of thoroughfare, **$440,000,** $379,000 authorized; underpass in S. Western Ave. at 26 St. under A.T. & S.F. Ry., C.B. & Q. and Ill. Northern Rd., construction between Anthony Ave. and South Chicago Ave., street opening, **$360,000** authorized; contract plans 10% completed underpass in W. Cermak Rd. at Trumbull Ave., reconstruction, widening roadway, eliminating sharp turns, **$800,000,** $10,000 authorized; underpass in S. Ashland Ave. near W. 41 St. under Chicago Junction Ry., reconstruction, elevating tracks, eliminating obstruction and widening roadway, **$1,018,000,** $20,000 authorized; underpass W. Grand Ave. and N. Homan, eliminating sharp turns, widening roadway, **$900,000,** $60,000 authorized; preliminary plans under way overpass grade separation exten. S. Franklin from W. Harrison to W. Cermak Rd., 7,500 ft. long with approaches etc., over railroad tracks **$7,230,000,** underpass in Grand Ave. at LaCrosse Ave., reconstruction, straightening and widening **$800,000,** underpass in N. Cicero Ave., north of Grand Ave., reconstruction, widening underpass $600,000, underpass under N.Y.C. at 87 St. and Yates Ave., opening thoroughfare through R.R. embankment by means of concrete and steel structure **$770,000,** plans grade separation from N. Central Ave. to Ozanam Ave., eliminating 9 grade crossings and 3 obstructions with grade separations **$4,105,000.** No funds authorized. W. W. De Berard, City Hall, city engr. A. Engh, c/o owner, engr.

★**Massachusetts**—Commonwealth of Massachusetts, 100 Nashua St., Boston, plans completed 0.2 mi. elimination of grade crossing Bridge St., Route 107, Salem, $650,000; 0.7 mi. elimination of grade crossing on Route 140, County St., Taunton, $210,000; 0.3 mi. elimination of railroad crossing at Bird St., Boston, Suffolk Co., $120,000; 0.5 mi. bridge over Nashua River on Ayer-Shirley Rd., towns of Ayer, Harvard, Shirley, **$200,000;** 0.4 mi. railroad bridge on Route 126 (Bakers Bridge) Lincoln, $120,000; 0.3 mi. construct bridge over Swan River on Route 28, Dennis, **$53,000;** 0.3 mi. railroad bridge on E. Main St., Route 2, Ayer, $165,000; reconstructing 0.3 mi. railroad bridge on Route 37 in South Braintree, Braintree, **$170,000;** 0.3 mi. railroad bridge on Route 1 at Dodgeville, Attleboro, $215,000. Land rights not cleared, legal obstacles to be overcome and financing not provided.



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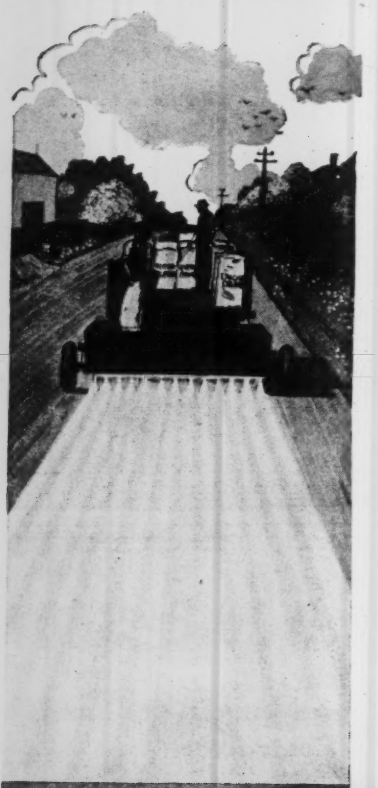

Substantial road improvement is the reward of the highway official who conditions his gravel roads early, while moisture is still available for proper shaping and compaction. Further reward comes to those who apply calcium chloride early to hold the moisture which binds the fine cementing materials. This work should be done before these essential binder soils can blow away as dust.

Too little has been said about the use of calcium chloride to prevent evaporation of the roadbed moisture —so essential to maintain compaction. Early road conditioning and early application of calcium chloride will work wonders. Bulletin 29 tells how—it is sent on request.

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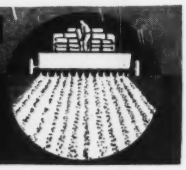

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POSTWAR PROJECTS (Cont'd.)

Minn., Thief River Falls—City of Thief River Falls and Pennington Co., plan [illegible] way rein.-con. bridge, approach, $[illegible]. Land rights not cleared, financing [illegible] vided. P. A. Helseth, 5309 35th Ave. S., Minneapolis, consult. engr.

★**N. Y., New York**—President, Bronx Boro, 851 Grand Concourse, plans [illegible] grade separation at East Tremont Ave. & Southern Blvd., Proj. PX-28, **$637,500**. Financing not provided. Robinson & Stevens, 117 Liberty St., New York, Zone 6, consult. engrs.

Okla., Oklahoma City—Oklahoma City, Oklahoma City, plans 60% completed steel concrete bridge across North Canadian River at McArthur Blvd. west of Oklahoma City, **$110,000.** Financing not provided. W. C. McFerron, Court House, co. engr.

READY FOR BIDS

Rhode Island—State Dpt. Hys. & Bridges, State House, Providence, plans completed rigid frame highway bridge, Kingston Rd. No. 403, in Richmond. **$100,000.** Fay, Spofford & Thorndike, 11 Beacon St., Boston, Mass., consult. engrs.

STREETS AND ROADS

PROPOSED WORK

Calif., Exeter—City, City Hall, constructing street imprvs. **$40,000.**

Ill., Alton—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, roads, curbs and walks at Alton State Hospital, **$140,000.** Financing not provided.

Ill., Chicago—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, roads at Chicago State Hospital, **$34,000.** Land rights not cleared.

Ill., Dixon—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, roads, walks, Dixon State Hospital, **$125,000.** Financing not provided.

Ill., Dwight—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavement, curbing, guttering walks at State Reformatory for Women. **$100,000.** Financing not provided.

Ill., East Moline—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, concrete driveways, at East Moline State Hospital, **$153,000.** Financing not provided.

Ill., Elgin—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, road at Farm Colony, Elgin State Hospital. **$10,000.** Financing not provided.

Ill., Jacksonville—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavements at Jacksonville State Hospital. **$110,000.** Financing not provided.

Ill., Jacksonville—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavements at Illinois School for the Blind, **$35,000.** Financing not provided.

Ill., Kankakee—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavement, guttering, curbing at Kankakee State Hospital. **$150,000.** Financing not provided.

Ill., Lincoln—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavement curbing, guttering, at Lincoln State School and Colony, **$300,000.** Financing not provided.

Ill., Manteno—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavements, walks, switch track at Manteno State Hospital. **$380,000.** Financing not provided.

Ill., Normal—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavement, parking lots, and walk repairs, at Soldiers and Sailors Childrens Home, **$86,000.** Financing not provided.

Ill., Peoria—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavements at Peoria State Hospital. **$250,000.** Financing not provided.

Ill., St. Charles—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, pavements at Training School for Boys, **$144,000.** Financing not provided.

Ill., Springfield—State Fair Div., State Fair Grounds, Springfield, 25 year program, sidewalks, curbing, guttering, **$100,945;** grading, terracing, landscaping, **$175,000,** at State Fair Grounds. Financing not provided.

O., Toledo—City, Safety Bldg., street approaches necessary in connection with new union station to be built by New York Central R. R. at Wade Ave., west of present station, **$300,000.**

Okla., Ringling — Comrs. Jefferson Co., gravel oil and bridge work, **$200,000.** Financing not provided.

★**Washington**—State Hy. Dpt., C. H. Hickey, dir., Transportation Bldg., Olympia, completing last 8 mi. White Pass Hy. over Cascade Mountains. **$1,000,000.** Financing not provided.

PLANS UNDER WAY

Calif., Pacific Grove—City, City Hall, plans under way street pavements, **$35,000;** curbs, gutters, sidewalks, **$30,000.** Financing provided.

Calif., Oroville—City, City Hall, plans 50% completed Myers St. setback, **$48,548;** plans 20% completed exten. Montgomery St., **$76,415.** Financing not provided. S. J. Norris, City Hall, city engr. CD 1/31—ENR 2/22.

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POSTWAR PROJECTS (Cont'd.)

Illinois—State Div. Hys., Centennial ... Springfield, preliminary sketches ... paving 17 St. from city limits south ... 1 mi., south of Silvis, 18-20 ft. wide ... Island Co. **$50,000.** W. W. ... engr. A. R. Boudinot, 1630 ... Ave., M... acting city engr for Silvis.

Me., Portland—City, City Council ... Hall, plans under way relocating Commercial St. in connection with proposed ... development, **$100,000.**

★**Massachusetts**—Commonwealth of Massachusetts, 100 Nashua St., Boston, ... completed reconstructing 4.3 mi. State ... on Route 114 from Route 125 to Middleton ... North Andover, **$275,000;** 2.8 mi. State ... Route 140 from 1941 project to point ... Tremont St., Taunton, **$330,000;** 2.3 mi. ... Hy. on Route 107 from Buchanan Bridge ... point near Salem Hospital, Lynn and Sa... **$490,000;** 1.3 mi. State Hy. on Route 37 ... Brockton line nrtherly, Holbrook, $160,... 1.7 mi. State Hy. on Route 37 from R... 128 to Holbrook line, Braintree, $200,... 1.5 mi. State Hy. on Route 7... Lanesb... **$90,000;** 3.4 mi. State Hy. on Routes 6 and ... from Route junction to Cohassett Narrows ... Bridge, Wareham, **$670,000;** 0.8 mi. State ... on Main St., Route 20, Watertown, $100,... 0.7 mi. North Rd. Route 3, completion ... Lowell Bypass, Chelmsford, $95,000; 0.2 ... Circle at Littleton Common, Routes 2 ... and 119, Littleton, **$35,000;** 1.9 mi. ... barrel from Route 1 to Wakefield Line, Route ... 128, Lynnfield, **$310,000;** 3 mi. Newburyport ... Turnpike, Route 1, from South Lynnfield ... Danvers line, Lynnfield and Peabody, $1,... **000;** 1 mi. exten. Route 128 from 1940 pro... to Route 1A, Danvers and Beverly, $7... 1.6 mi. by-Pass of Grove St., Route ... Middleboro, **$750,000;** 1.7 mi. Route 106 ... Route 138 to Cohassett, Easton-West Brid... water, **$125,000;** widening 0.5 mi. Route ... Bway and Rockland St. intersections, ... over, **$50,000;** 1.5 mi. approach to Bed... Airport from Route 2A, Lexington, Lex... and Bedford, **$110,000.** Land rights ... cleared, legal obstacles to be overc... financing not provided.

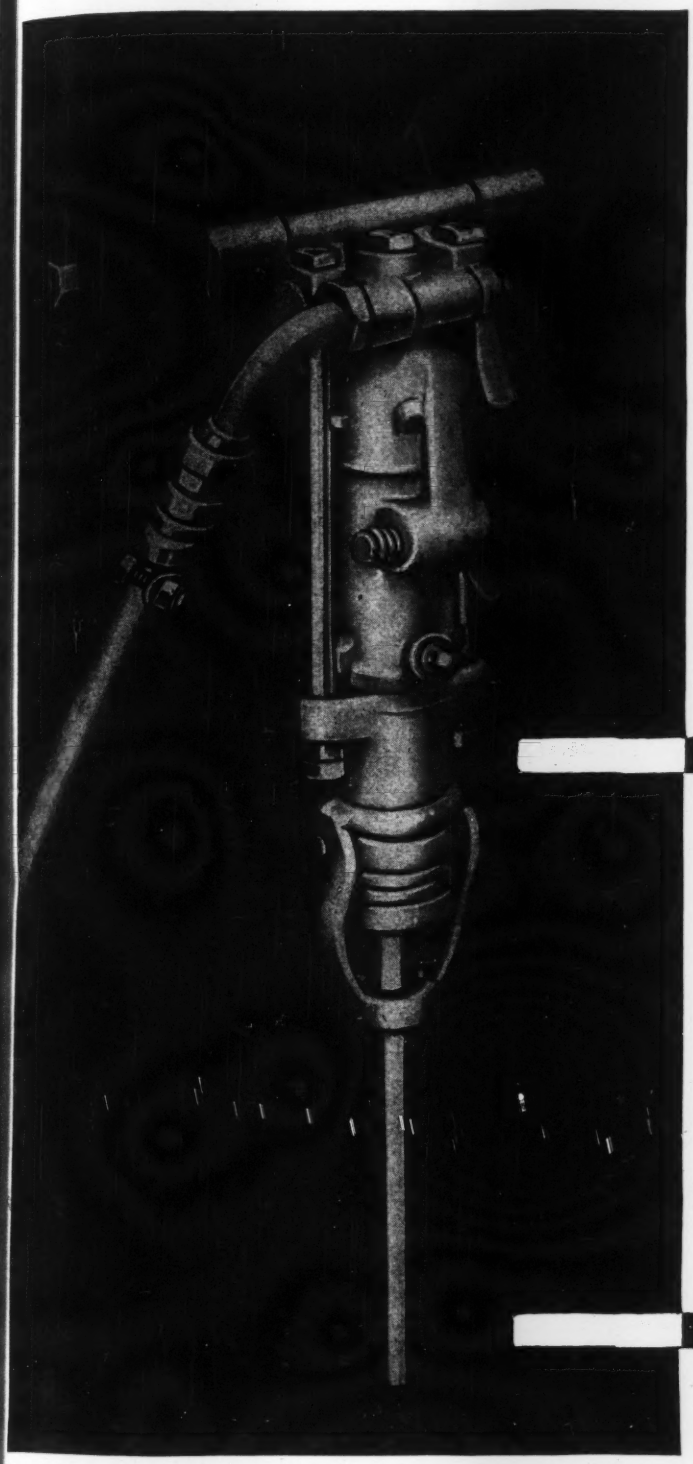
★**Minn., Bemidji**—Beltrami Co. Hy. ... Court House, plans 60% completed ... building gravel roads, blacktop others, ... building bridges, **$250,000.** Land not clear... financing provided. E. W. Downa... Bemidji, co. engr.

Minn., Dodge Center—Village, V... Crouch, clk., City Hall, paving downt... streets, **$25,000.** Financing not provided. ... A. Davis, 1406 Oseola Ave., St. Paul, cons... engr.

Minn., Mora—Kanabec Co., Mora, pl... 50% completed highway, **$50,000.** Financ... provided.

Minn., Thief River Falls—Pennington ... Thief River Falls, plans 80% completed gr... ing 61.5 mi. county aid highway, $114,... grading, graveling 29 mi. State Aid Roads, ... Federal Aid Secondary Sys., **$134,600.** J... Erickson, co. engr.

★**Missouri**—State Hy. Comn., Jeffe... City,, plans 90% completed graded ... and surface treatment 4.357 mi. road fr... Fillmore South, **$39,000;** 0.147 mi. ... from Savannah east, **$29,000,** both Andr... Co.; 2.882 mi. road from Iowa state l... south, Route T, **$30,000;** 3.94 mi. road fr... Route 275 east, Route B, **$34,000,** both Atc... son Co.; 0.568 mi. road from St. Joseph ... airport, Route OO, **$232,000;** 0.754 mi. ... from St. Joseph to Route 71, Route 9... **$42,000;** 14 mi. road from Andrew Co. to ... Joseph, **$90,000;** 0.237 mi. road from Agn... east, Route H, **$50,000;** 4.03 mi. road fr... Route E to Gowen, Route H, **$40,000,** ... foregoing Buchanan Co.; 3.71 mi. road ... tween Breckenridge to Bragmer, Route ... **$33,800;** 6.36 mi. road between Breckenr... and Bragmer, Route A, **$42,300,** both Ca... well Co.; 7.079 mi. road from Route 5 west ... Route A(1), Route C, **$62,000;** 2.156 mi. ... from Route 5 east to Route B(29), Ro... D, **$32,000,** both Chariton Co.; 2.036 mi. ... from 1 mi. west of Mecca, Route D, $44,... 4.409 mi. road from Route 33 east to Tur... Route H, **$29,000,** both Clinton Co.; 2.6 ... road from ¼ mi. south of Lick Springs ... south to Route H, Route M, **$44,500;** 8.82 ... road from east of Route 13 east to Route ... Route H, **$53,500,** both Daviess Co.; 3.567 ... road from Fairport West, Route E, $41,... 4.393 mi. from Route 169 east, Route E, $4... **400,** both DeKalb Co.; 3.498 mi. road fr... King City east to Berlin, Route Z, $37,100; ... mi. road from Nodaway Co. east to Route ... Route M, **$45,900;** 4 mi. road from Darlin... south, Route H, **$32,000,** all foregoing Ge... Co.; 4.319 mi. road from Route M, Lat... east to Linn Co., Route B, **$55,000;** 5.73... road from Route 65 west and north, Rout... **$35,000,** both Grundy Co.; 8.8 mi. road fr... Ridgeway south to Route 4, Route T, $48,... 4.29 mi. road from ⅛ mi. east Milbur... Route H, **$24,900;** 4.59 mi. road from pres... const. E to Hatfield east to Route 69, Ro... E, **$66,000,** all foregoing Harrison Co.; ... mi. road from Atkinson Co. south, Route ... **$45,400;** 3.29 mi. road from pres. constr. ... of Mound City, Route N, **$53,100,** both H... Co.; 7.816 mi. road from Route 11 south ... Macon Co., Route H, **$40,000;** 4.213 mi. ... from Route 63 east toward Wilson, $27,... Route E, both Adair Co.; 3.283 mi. ... Helena South to Buchanan Co. line, Route



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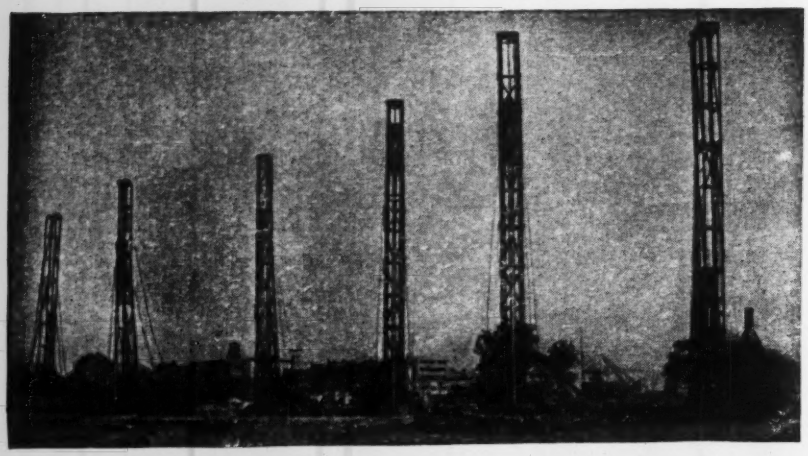

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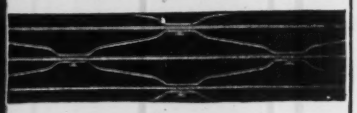

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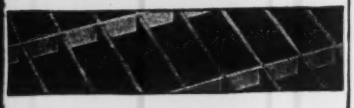

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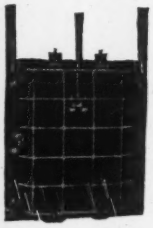

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POSTWAR PROJECTS (Cont'd.)

Andrew Co., **$48,200;** 3.5 mi. road from Lewis Co. west, Route K, **$45,000;** 4.99[illegible] from Baring east, Route K, **$34,000;** 2 mi. road from Route 6 west to Knox Co., Route V, **$25,000,** all foregoing Knox Co. 3.57 mi. road from Brookfield Airport to Sullivan Co., Route M, **$115,000,** Linn Co.; 6.[illegible] mi. road from Wheeling north to Route B, Route M **$30,000;** 2.827 mi. road from Ludlow South to Carroll Co., Route D, **$50,000,** both in Livingston Co.; 2.014 mi. road from Colle[illegible] Mo., North, Route C, **$25,000;** 11.5 mi. road from Route 36 to Calloa north to Route 4, Route H **$60,000;** 9.5 mi. road from Route 6[illegible] Ex-lo, east to Shelby Co., Route Y, **$63,000;** 4 mi. State Road Route K, east to Shelby Co., Route M, **$31,000,** all foregoing Monroe Co. 3.96 mi. road from Route E east in Worth Co., Route D, **$29,000;** 9.621 mi. road from Route D south to present constr. Route E, **$62,800;** 5.06 mi. road from Burlington Jct. south to Quitman, Route H, **$31,200;** 4 mi. road from Iowa Line south to Route E, Route E, **$26,400,** all foregoing Nodaway Co. 9.296 mi. road from Route N, west and north to Route A, Route F, Livingston Co. **$30,000;** 4.4 mi. road Route 11 east, Route 1 **$30,000;** 1.355 mi. road from Wilson west, Route E **$39,000.** C. W. Brown, Jefferson City, chief engr.

★ **Oregon**—State Hy. Dpt., Salem, 50-mi. highway from Bates to Baker, **$2,500,000.** Financing not provided. R. H. Baldock, state hy. engr.

Tex., Dallas—City, City Hall, plans under way surfacing 451 mi. alleys. **$300,000.**

Tex., Freeport—City, City Hall, plans 25% completed street paving. **$150,000** bonds voted. C. P. Smith, Orange, engr. CD 3/[illegible]—ENR 4/5.

Tex., Lubbock—City, City Hall, plans 75% completed, paving residential areas. **$100,000.** A. L. King, City Hall, city engr. CD 4/[illegible]—ENR 5/18/44.

★ **Va., Arlington**—Arlington Co., Court House, concrete paving 5 streets and highways, **$2,320,000.** Financing not provided. C. L. Kinnier, Court House, co. engr.

READY FOR BIDS

Minn., Thief River Falls—Pennington Co., Thief River Falls, plans completed graveling 137 mi. county aid road, **$45,664.** J. A. Erickson, co. hy engr.

Tex., Palo Pinto—Palo Pinto Co., co. Judge, Court House, Mineral Wells, plans completed drainage and 40 mi. bitum. mat surfacing, drainage structures. **$40,000.** Financing provided. CD 3/7—ENR 3/22.

EARTHWORK, WATERWAYS

PROPOSED WORK

★ **Wash., Olympia**—State Capitol Com., Olympia, development Deschutes waterway adjacent to capital. **$1,000,000.** Financing provided.

PLANS UNDER WAY

★ **N. Y., New York**—Dpt. Parks, R. Moses, comr., Arsenal Bldg., 64 St. and 5 Ave., Central Park, plans 50% completed bulkhead and restoration Park Ave., Battery Park at Brooklyn-Battery Tunnel approaches **$1,642,475.** Financing not provided. S. Constable, c/o owner, ch. park designer.

Tex., Freeport—City, City Hall, plans 25% completed drainage, **$100,000** bonds voted. C. P. Smith, Orange, engr. CD 3/22—ENR 4/5.

LATIN AMERICA

Cuba, Havana—Republic of Cuba, Havana, in association with Municipality, plans WW rehabilitation. **$15,000,000.**

Santo Domingo, Manzanillo Bay—Dominican Republic Ciudad Trujillo, plans deep water port. **$3,500,000.** Dpt. P. Wks., Ciudad Trujillo, engrs.

Santo Domingo, Santiago—Dominican Republic, Ciudad Trujillo, plans hydro electric development at Rio Yaqui in Santiago Dr. **$2,000,000.** Dpt. P. Wks., Ciudad Trujillo, engr.

PUBLIC BUILDINGS

PROPOSED WORK

★ **Colo., Denver**—Denver Art Museum, City and County Bldg., art museum, **$500,000.**

Conn., East Port Chester (Mail Port Chester, N. Y.)—Town of Greenwich, Fire Dist., Havemeyer Pl., Greenwich, brick, steel, concrete fire station, Delevan and Mead Sts. **$160,000.** Financing not provided.

Conn., Meriden—City Hy. Dpt., City Hall, garage and maintenance facilities for highway and garbage fleet of trucks. **$60,000.** Financing not provided.

Conn., Meriden—City Water Dpt., City Hall, brick repair and storage bldg. **$40,000.** Financing not provided.

★ **Ill., Alton**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, 3 bldgs., **$660,000;** laundry, **$30,000;** mechanical bldg., **$125,000;** acute hospital, **$300,000**

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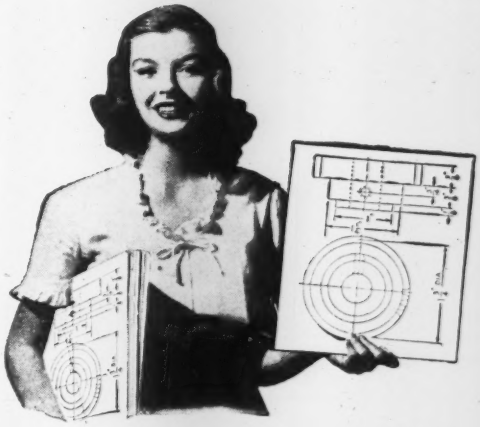

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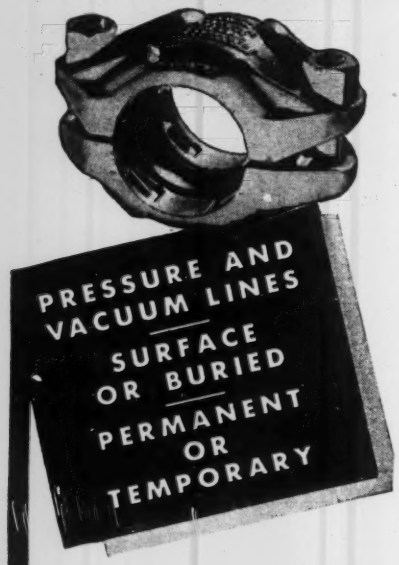

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POSTWAR PROJECTS (Cont'd.)

remodeling 5 bldg., **$850,000**; repairing power plant, **$322,000**; laboratory, **$50,000**; greenhouse, **$30,000**; firehouse, **$35,000**; occupational therapy bldg., **$150,000**; 5 farm bldgs., **$90,000**; staff residences, **$70,000**, at Alton State Hospital. Financing not provided.

Ill., Anna—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program utilities and services 5 projects at Anna State Hospital, **$227,000**. Financing not provided.

★**Ill., Anna**—Dpt. P. Welfare, Executive Office, Springfield, 25 year program, rehabilitation main bldg., **$1,285,000**; hospital and diagnostic bldg., **$250,000**; vegetable preparation bldg., **$150,000**; store, **$300,000**; altering 3 bldgs., **$500,000**; power house addn., **$250,000**; occupation and recreational therapy bldg., **$150,000**; industrial shop, **$150,000**; altering nurses home, **$160,000**; 2 ward bldgs., **$440,000**; staff cottages, **$45,000**, at Anna State Hospital. Financing not provided.

★**Ill., Carbondale**—Dpt. Registration & Educ., Executive Offices, Springfield, 25 year program, power plant, tunnels, main feeder, service shops, storeroom, **$226,881**; library, **$2,970,520**; farm bldgs., **$53,469**; industrial arts bldgs., **$286,443**; commerce bldg., **$445,578**; life science bldg. and greenhouse, **$577,481**; administration bldg., **$510,478**; field house, gymnasium, swimming pool, **$1,237,327**; 4 men's residences, **$634,842**; girl's dormitory and dormitory addn., **$135,710**; industrial arts bldg., **$285,050**; Earth Science Fine Arts bldg., **$703,117**; handicapped children's bldg., **$965,625**; home economics bldg., **$363,136**; home management house, **$85,663**; museum, **$258,880**; boys dormitory, **$1,780,767**; student lounge bldg., **$960,166**; health bldg., **$254,732**; industrial arts bldg., **$427,578**; women's swimming pool, **$135,712**; athletic stadium, east wing, **$128,661**; 3 plane hangar, **$26,769**; Boys West Housing unit, **$634,843**; observatory and service bldg., **$77,456**; women's residences, **$2,347,350**, all at Southern Illinois Normal University. Land rights not cleared, financing not provided.

★**Ill., Charleston**—Dpt. Registration & Educ., Executive Offices, Springfield, 25 year program vocation education-service bldg., **$870,814**; heating plant addns., tunnels, greenhouse, **$516,687**; health education bldg., **$198,822**; home management bldg., **$65,794**; remodeling Student Center, **$244,007**; men's dormitory, **$991,941**; auditorium-fine arts bldg., **$1,039,302**; women's residence hall addn., **$495,960**; armory, **$301,373**; women's dormitory, **$892,747**; women's gymnasium, **$234,160**; president's house, **$40,546**, at East Illinois State Teachers College. Land rights not cleared, financing not provided.

★**Ill., Chicago**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, residential unit, **$1,250,000**; bath house, **$90,000**; employees dining room addn., **$40,000**; power house, **$660,100**; storage, **$36,000**; altering 9 bldgs., **$1,100,000**; hospital addn., **$30,000**; altering 8 bldgs., **$200,000**; 6 residences, **$110,000**; dry cleaning bldg., **$25,000**; all at Chicago State Hospital. Financing not provided.

★**Ill., DeKalb**—Dpt. Registration & Education, Executive Offices, Springfield, 25 year program, training school addn., **$204,393**; student union bldg., **$264,969**; women's gymnasium, **$322,089**; field house, **$761,661**; service bldg., **$267,089**; completing science bldg. and greenhouse, **$90,420**; fine arts bldg., **$486,570**; music bldg., **$360,644**; auditorium, **$482,661**, at Northern Illinois State Teachers College. Land rights not cleared, financing not provided.

★**Ill., Dixon**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, industrial bldg., **$125,000**; storage, **$30,000**; hospital and diagnostic bldg., **$600,000**; power house, **$585,460**; tuberculosis bldg., **$220,000**; altering 56 units, **$520,000**; 4 patients residential units, **$800,000**; children's cottages, **$250,000**; office, **$150,000**; store addn., **$130,000**; shop, **$70,000**; nursery addn., **$40,000**; farm bldgs., **$150,000**; laundry addn., **$140,000**; 2 hospital units, **$268,000**, at Dixon State Hospital. Financing not provided.

Ill., Dwight—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, mechanical bldg., **$100,000**; storehouse addns., **$50,000**; employees bldg., **$80,000**; occupational bldg., **$75,000**; chapel, **$75,000**, for State Reformatory for Women. Financing not provided.

Ill., East Moline—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, altering utilities at East Moline State Hospital, **$153,000**. Financing not provided.

★**Ill., East Moline**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, hospital and diagnostics bldg., **$450,000**; altering 6 units, **$1,144,065**; power plant, tunnels, **$735,000**; store, **$46,675**; kitchen and dining room addn., **$150,000**; Trades Bldg., **$200,000**; laundry addn., **$40,000**; altering nurses home, **$163,000**; staff cottages, **$100,000**; farm bldgs., **$97,000**; farm cottage addn., **$90,000**, at East Moline State Hospital. Financing not provided.

Ill., East St. Louis—Div. Hy., Maintenance Police, Div. P. Safety, Armory Bldg., Springfield, headquarters bldg. **$185,250**. Land rights not cleared, financing not provided.

Ill., Elgin—Div. Hy., Maintenance Police, Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, headquarters bldg., **$195,400**. Financing not provided.

★**Ill., Elgin**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, acute hospital addn., **$150,000**; laundry bldg., **$213,000**; altering main bldg., **$900,000**; storage, **$250,000**; altering annex bldg., **$400,000**; Loewy Cottage, **$340,000**; administration bldg., **$250,000**; cannery bldg., **$110,000**; Callahagan Cottage addn., **$80,000**; tuberculosis sanitarium unit, **$460,000**; farm cottage bldg., **$280,000**; 2 ward bldg., **$680,000**; laundry bldgs., **$281,427**; farm bldg. addn., **$55,750**; altering cottages, **$47,380**; O. T. and P. T. Bldg., **$150,000**; nurses training bldg., **$150,000**, at Elgin State Hospital. Financing not provided.

★**Ill., Geneva**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, power house addn., replacements, **$325,000**; altering 16 bldgs., **$1,550,000**; store and dairy bldg., **$200,000**; hospital addn., **$48,500**, at Training School for Girls. Financing not provided.

Ill., Jacksonville—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, altering main bldg., **$300,000**; altering 4 bldgs., **$201,000**; gymnasium **$75,000**; power plant addns., **$80,000**; library addns., **$31,000**; vocation bldg., **$50,000**, for Illinois School for the Blind. Financing not provided.

★**Ill., Jacksonville**—Dpt. P. Welfare, Executive Offices, Jacksonville, 25 year program combination dormitory and school bldg., **$450,000**; vocational bldg., **$225,000**; hospital, **$160,000**; student activity center, **$150,000**; power plant addns., **$225,000**; altering main bldg., **$475,000**; employees bldg. and kitchen, **$50,000**; store and bakery bldg., **$100,000** at State School for Deaf. Financing not provided.

★**Ill., Jacksonville**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, annex bldg., **$1,300,000**; store, **$225,000**; mechanical store, **$240,000**; main bldg., **$1,250,000**; psychiatric nurses school, **$250,000**; laundry addn., **$60,000**; nurses home alteration, **$350,000**; occupational therapy bldg., **$150,000**; farm bldgs., **$100,000**; altering 6 units, **$153,300**; patients residence, **$220,000**; laboratory, **$150,000**; cannery, **$60,000**, at Jacksonville State Hospital. Financing not provided.

★**Ill., Joliet**—Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, cell house, **$463,500**; reconditioning administration bldg., **$51,500**. Financing not provided.

★**Ill., Kankakee**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, hospital, **$525,000**; central kitchen and employees dining room, **$425,000**; altering 34 bldgs., **$2,950,000**; tuberculosis unit, **$1,000,000**; patient bldg., **$265,000**; shop bldg., **$250,000**; dry cleaning plant, storage, **$125,000**, at Kankakee State Hospital. Financing not provided.

★**Ill., Lincoln**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, altering 7 bldgs., **$724,000**; vocation school, **$200,000**; power plant, **$795,000**; staff house, **$200,000**; gymnasium and amusement hall, **$150,000**; patients bldg., **$976,000**; altering main farm bldg., **$105,722**; store and pasteurizing plant, **$175,000**; bldgs. and addns. at Farm Colony, **$185,500**; school, **$57,100**; vocation school, **$200,000**; altering main bldg., **$349,949**, at Lincoln State School. Financing not provided.

Ill., Macomb — Div. Hy., Maintenance Police, Div. P. Safety, Armory Bldg., Springfield, 25 year program, headquarters bldg. **$180,250**. Financing not provided.

★**Ill., Macomb**—Dpt. Registration and Education, Executive Office, Springfield, 25 year program, library bldg., **$628,830**; gym bldg., **$20,950**; president's house, **$31,116**; agricultural implement house, **$29,231**; men's dormitory, **$396,756**; field house, **$269,713**; auditorium and music bldg., **$363,423**; industrial plant and physical plant bldg., **$649,017**; Home Economics addn. to Arts Bldg., **$504,988**; student union bldg., **$235,906**, at Western Illinois State Teachers College. Land rights not cleared, financing not provided.

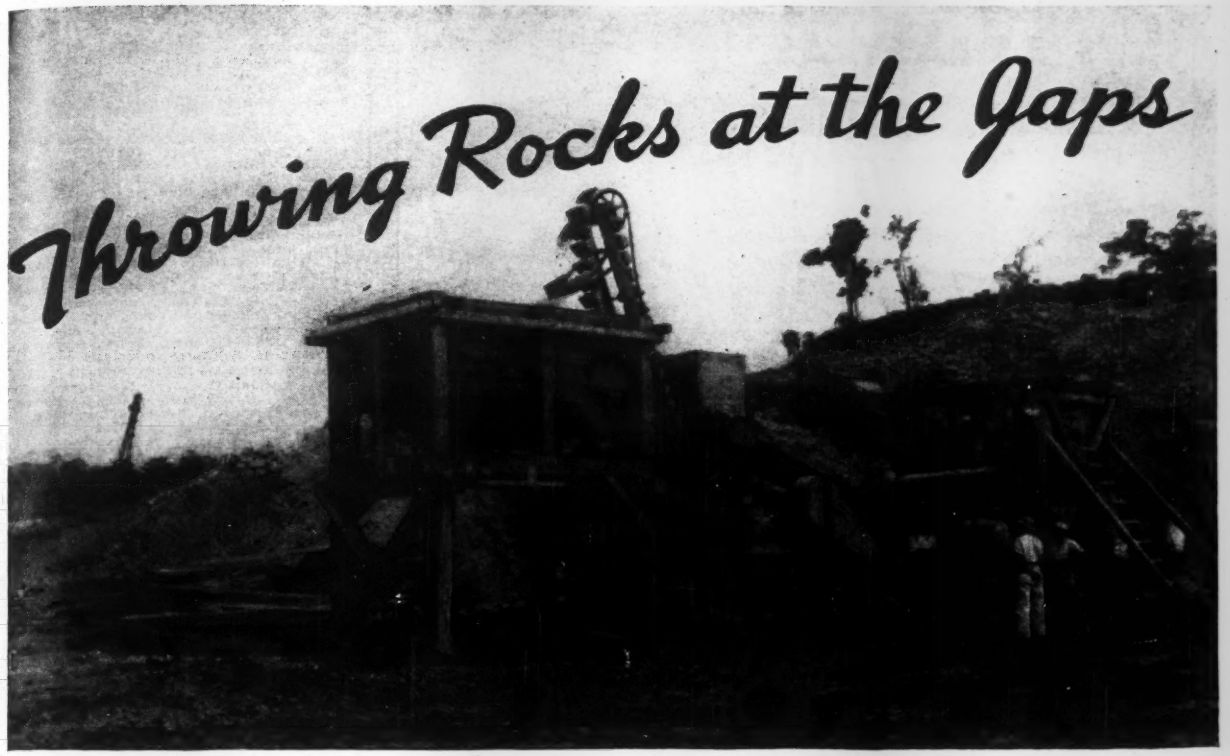
Ill., Macomb—Dpt. Registration & Educ., Executive Offices, Springfield, 25 year program stadium, at Western Illinois State Teachers College, **$323,520**. Land rights not cleared, financing not provided.

★**Ill., Manteno**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, power house alterations, addns., **$425,000**; hospital, **$625,000**; dining room bldg., **$275,000**; cannery **$100,000**; general facilities bldg., **$95,000**; occupational therapy bldg., **$200,000**; slaughter house, **$50,000**; greenhouse, **$30,000**; laundry addn., **$75,000**; staff bldg., **$85,000**; 2 garages, **$45,000**; chapel, **$175,000**; staff apartment, **$242,500**; 3 laundry addns., **$135,000**, at Manteno State Hospital. Financing not provided.

Ill., Menard — Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, store bldg., **$87,550**; farm bldgs., **$103,000**; reconditioning cold storage bldg., **$51,500**. Financing not provided.

★**Ill., Normal**—Dpt. Registration & Educ., Executive Offices, Springfield, 25 year program, University High School and University Elementary School Bldgs., **$2,340,160**; special education bldg., **$976,903**;

Throwing Rocks at the Japs



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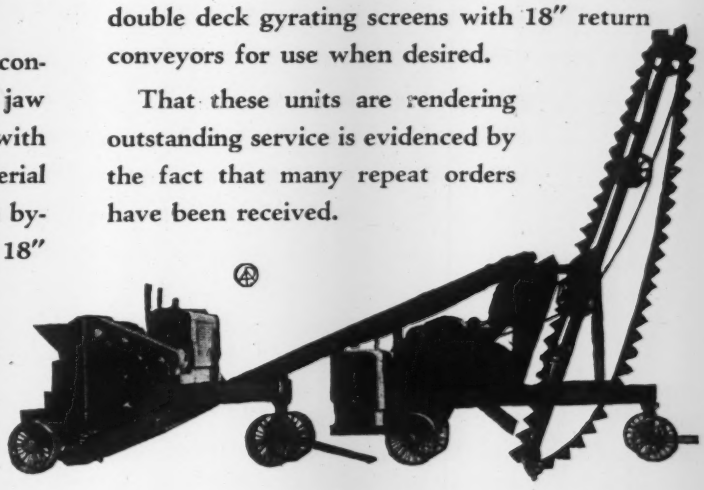

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POSTWAR PROJECTS (Cont'd.)

larging heating plant, $782,887; [illegible] addn., $414,879; Smith Hall addn., $395,164; Student Union Bldg., $500,214; [illegible] hall, $793,583; McCormack gymnasium, $233,398; Industrial Arts addn., $67,114; remodeling bldgs., $233,398; men's gymnasium, $957,902; arts bldg., $573,424; Business Education bldg., $573,424; [illegible] bldg., $573,424; stadium, $194,052; field house and armory, $369,272; storage, $30,648; completing Smith Hall, $297,582; [illegible] women's residence, $793,553, at Illinois State Normal University. Land rights not cleared, financing not provided.

★ **Ill., Normal**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, administering administration bldg., $496,000; power plant addns., $350,000; store and cold storage bldg., $150,000; altering, constructing addns. Isolation Hospital and receiving cottages, $25,000; general kitchen, bakery and dining room, $250,000; recreation building and chapel, $200,000; gymnasium, alterations, addn., $75,000; laundry addns., $30,000; farm bldgs., $30,000; shop, $70,000; warehouses, $25,000, at Soldiers and Sailors Children's Home. Financing not provided.

Ill., Peoria—Div. Hy., Maintenance Police, Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, headquarters bldg., $195,100. Financing not provided.

★ **Ill., Peoria**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, altering 24 units, $1,333,000; amusement hall, $180,000; occupational therapy bldg., $150,000; power house, $700,000; tuberculosis unit, $250,000; hospital, $250,000; pasteurizing plant, $25,000; mechanical bldg., $144,650; residences, $40,000; laundry addn. $30,000; bakery bldg., $55,600; barn, $15,000, at Peoria State Hospital. Financing not provided.

★ **Ill., Pontiac**—Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, bldgs., repairing farm bldgs., $412,000; reconstructing north and south cell houses, $669,500; remodeling power house into cold storage plant, $77,250; canning plant, $61,800; maintenance shop, $41,200; warehouse, $51,500. Financing not provided.

★ **Ill., Quincy**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, altering 22 cottages, $110,000; altering power plant, $305,000; member-employee dormitory, $300,000; hospital, $375,000; 2 dormitories, $700,000; laundry, $50,000; occupational therapy bldg., $185,000; mechanical stores bldg., $150,000; altering 4 bldgs., $65,000, at Soldiers and Sailors Home. Financing not provided.

★ **Ill., St. Charles**—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, hospital, $150,000; central dining room and kitchen, $252,800; replacing farm cottages, $128,000; altering 20 bldgs., $1,366,749; 5 administrative staff cottages, $75,000; chapel, $125,000; mechanical shop, $57,000; administration bldg., $178,000, power plant addns., $200,000, at Training School for Boys. Financing not provided.

★ **Ill., Springfield**—Secretary of State, Armory Bldg., 25 year program, power plant, equip., tunnels, piping, $1,823,200; Archives Bldg. addn., Illinois State Library, $2,646,466. Financing not provided.

★ **Ill., Springfield**—State Fair Div., State Fair Grounds, Springfield, 25 year program, coliseum, $1,545,000; judging pavilion, $46,350; 11 concrete barns, $396,550; modernizing present bldg., $793,100; concrete, steel stadium, $927,000; grand stand exten., $128,750 open air theatre, $51,500; street lights and sound sys., $334,750, at State Fair Grounds. Financing not provided.

★ **Ill., Stateville**—Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, power house addn., incl. two 500 hp. boilers, $206,000; horse barn on Honor Farm, $41,200; cattle feeding shed and hay storage, $51,500; 2 corn cribs and 2 granaries, $51,500; warehouse with outside wall, $77,250; diagnostic depot, $154,500; textile plant, $206,000; industry bldg., $77,250; mule barn, $41,200; dry cleaning plant, $20,600; detention bldg. addn., $25,750; solitary bldg. addn., $51,500. Financing not provided.

Ill., Tremont—School Dist. 311, Tremont, high school. $150,000.

Ill., Urbana—Div. Hys., Maintenance Police, Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, headquarters bldg. $195,400. Financing not provided.

Ill., Urbana—Dpt. Registration & Educ., Div. Water Survey, Executive Offices, Springfield, office bldg. and laboratory on Campus of University of Illinois. $386,250. Financing not provided.

★ **Ill., Vandalia**—Dpt. P. Safety, Armory Bldg., Springfield, 25 year program, administration bldg. and recreational center, $206,000; power, boilers and equip., $283,250; granary, $25,700; farm bldgs., $51,500; barn, $51,500; bldg. for guards and inmates, $154,500, warehouse, $66,950. Financing not provided.

★ **La., LaFayette**—LaFayette Charity Hospital c/o State, LaFayette, ward bldg., $250,000; hospital wing, etc., $400,000. Financing not provided.

La., Monroe—Florida Parishes Charity Hospital, c/o State, Monroe, hospital, etc., $250,000. Financing not provided.

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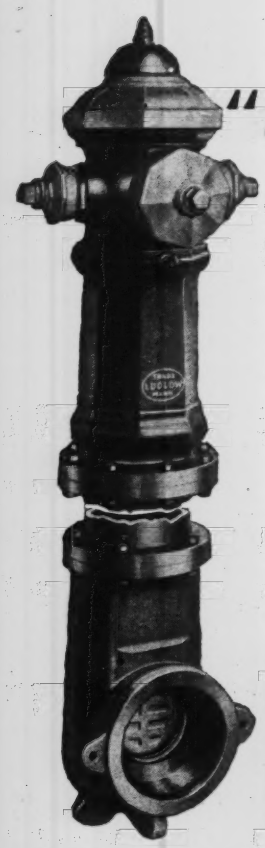

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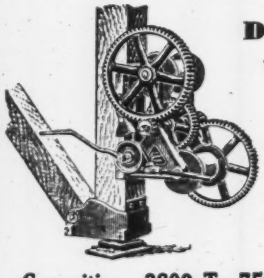

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POSTWAR PROJECTS (Cont'd.)

La., Monroe—Monroe Char... Hos... c/o State, Monroe, hospital, $...00,000. nancing not provided.

Me., Bangor—State, H. C. G... Heat. ... Institutions, State House, Aug... stitu... heating plant, **$50,000**; laund... bldg., ...000; electric wiring, fixtures, $...0,000. ... State Hospital. Financing not provided.

Me., Dexter—Town, O. J. ...tuplil... supt. Schools, Town Hall, b... high school. To exceed **$150,000**. Fina... not provided.

Me., Dresden Mills—Town ... Dr... Mills, A. Scilphen, Bd. Selectmen, sch... exceed **$150,000**. Financing not provided.

Me., Lisbon—Town, Chairman Bd. Se... men, Town Hall, concrete, brick high s... Over **$150,000**. Financing not provided.

Me., Monmouth—Town, G. M. Kend... supt. schools, Town Hall, Center S... addn. To exceed **$150,000**. Financing provided.

Me., Pittston (mail Gardiner)—Town ... Blodgett, chn. Bd Selectmen, Town Hall ... crete, brick consolidated school. To ex... **$150,000**. Financing not provided.

Me., Skowhegan—Town of Skowhegan ... Finley, supt. schools, Town Hall, ... school. To exceed **$150,000**. Financing provided.

Mass., East Braintree (Braintree)—T... of Braintree, E. Avery, chn. Bd Selectm... Town Hall, library. To exceed $150,... Financing not provided.

Mass., Holliston—Town of Holliston, S... Schools, Town Hall, high school. To ex... **$150,000**. Financing not provided.

Mass., Rockland—Town Bd. Selectm... Town Hall, war memorial community ... To exceed **$150,000**. Financing not provi...

Minn., Alexandria—Bd. Educ., Mrs. J. ... LeRoy, clk., voted **$225,000** bonds, school ... remodeling high school. CD 4/4.

★**Minn., Minneapolis**—City, Bd. P. ... fare, P. C. Phillips, bus. administra... City Hall, 10 to 13 story, brick, conc... General Hospital addn., 6 Ave. S. betw... 5 and 6 Sts., **$1,000,000**.

★**Minn., Minneapolis**—Bd. Comrs. Her... pin Co., A. P. Erickson, aud., city ... county office bldg., near site of exis... court house-city hall on block between ... 5 Sts., and 3 and 4 Ave. South, **$1,500,0...**

★**Mo., University City (St. Louis, Zone P.O.)**—City Bd. Educ., W. L. Metz... pres., 6701 Delmar Blvd., voted **$1,200,...** bonds, school, Blackberry and Groley R... addns. to Nathaniel Hawthorne Sch... Luther T. Ward Junior High School ... modernizing other bldgs., etc. CD 1... ENR 2/8.

Mont., Helena—State Bd. Examin... Helena, veterans' and pioneers' memo... bldg. **$400,000**. Financing provided.

R. I., Little Compton—Town of L... Compton, town hall and community ... nasium. To exceed **$150,000**. Financing ... provided.

Wash., Olympia—State Dpt. Finan... Olympia, Labor and Industries Bldg. add... **$200,000**; governor's mansion, **$100,000**; ... pairing Old Capitol Bldg., **$75,000**. Financ... provided.

★**Wash., Olympia**—State Dpt. Finan... Social Security Bldg., state office bl... **$1,000,000**. Financing provided. CD 1... ENR 3/22.

PLANS UNDER WAY

★**Calif., Pasadena**—Pasadena Bd. Edu... Pasadena, plans by C. Bennett, R. B... nett, 6 Westmoreland Pl., trades and te... nology bldg., men's gym., enlarging wome... gym., swimming pools, parking area, ... ministration bldg., library bldg., open ... bowl, etc., at Pasadena Junior Colle... **$750,000**.

Calif., Tulare—Tulare Union High Sch... Dist., Tulare, plans by E. J. Kump, ... Kearny St., San Francisco, high school add... **$150,000**. Financing not provided. CD 4/4...

Calif., Yuba City—Sutter Co., Hall of Re... ords, plans by H. J. Devine, Cronan Bld... Sacramento, 1 story rein.-con. court ho... **$150,000**. E. von Geldern, 407 2nd St., c... sult. engr.

Colo., Colorado Springs—City, City Ha... plans by Chas. E. Thomas, Colorado Spri... National Bank Bldg., police and fire stat... **$350,000**. Bonds voted.

Colo., Colorado Springs—City, City Ha... plans by E. Bunts, First National Ba... Bldg., memorial hospital. **$280,000**. Bon... voted.

★**Ill., Alton**—Dpt. P. Welfare, Execut... Offices, Springfield, plans by C. H. Ha... mond, state superv. archt., Armory Bl... Springfield, 6 cottages for tuberculosis pa... at Alton State Hospital. **$1,320,000**. Finan... ing not provided.

Ill., Alton—Illinois Armory Bd., Arm... Bldg., Springfield, plans by C. H. Hamm... state superv. archt., Springfield. Arm... Bldg., Springfield, armory, **$350,025**. Finan... ing not provided.

★**Ill., Bloomington**—Illinois Armory Bd... Armory Bldg., Springfield, plans by C. ... Hammond, state superv. archt., Arm... Bldg., Springfield, armory, **$514,769**. Finan... ing not provided.

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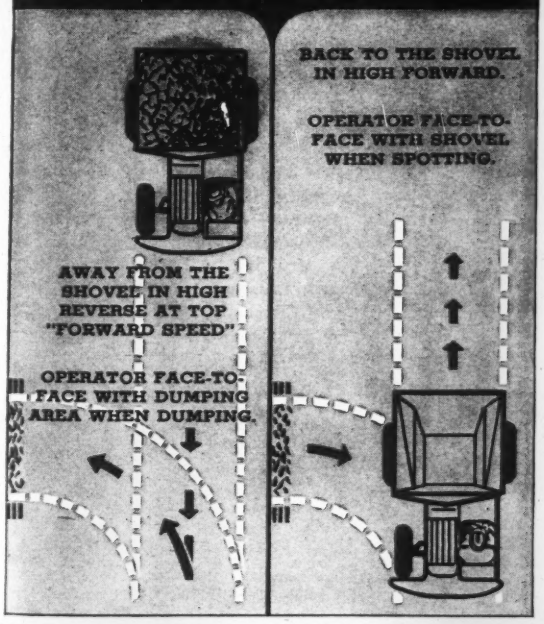
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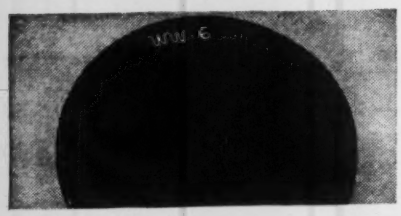

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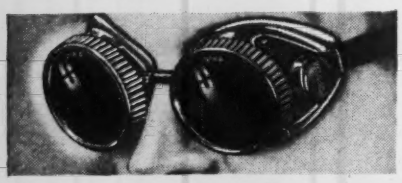

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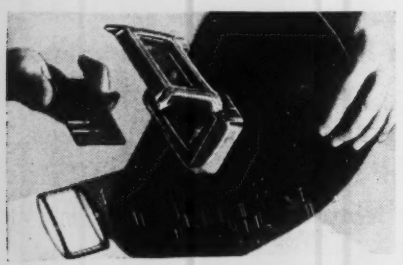

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POSTWAR PROJECTS (Cont'd.)

★**Ill., Carbondale** — Dpt. Registration & Educ., Executive Offices, Springfield, plans by C. H. Hammond, ste superv. archt., Armory Bldg., Springfield, training school, **$1,704,235**; site preparations, **$231,638**; power plant, shops, storeroom, feeder tunnels, **$1,950,000**, for Southern Illinois Normal University. Land rights not cleared, financing not provided. CD 5/12—ENR 6/1.

★**Ill., Chester**—Dpt. P. Welfare, Executive Offices, Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, 1st unit for new Illinois Security Hospital, **$2,500,000.** Financing not provided.

Ill., Chicago—Bd. Educ., 228 N. LaSalle St., preliminary plans by J. C. Christensen, 228 N. LaSalle St., Kellogg School addn., **$125,000**; Beidler School, **$125,000.** No funds authorized.

★**Ill., Chicago**—Bd. Educ., 228 N. LaSalle St., preliminary plans by J. C. Christensen, 228 N. LaSalle St., Hubbard High School, converting elementary school to high school, **$300,000**; 3 story South Shore High School addn., **$200,000.** Financing not provided.

★**Ill., Chicago** — Bd. Educ., 228 N. LaSalle St., preliminary plans by J. C. Christensen, 228 N. LaSalle St., 3 story Dunbar Vocational School addn., 4430 St. Lawrence Ave., **$288,000**; 2 story Spaulding addn., 1628 Washington Bld., **$200,000**; Tilden Technical High School, 4747 S. Union Ave., **$200,000**; 3 story Waller High School addn., 2007 Orchard St., **$250,000**; 2 and 3 story, Washburn Trade School addn., 1225 Sedgwick St., **$400,000**; Crane Tech. High School, 2245 Jackson Blvd., **$350,000**; 3 story DuSable High School addn., 6200 S. Hamlin Ave., **$550,000**; 4 story Harper High School addn. 6520 Wood St., **$350,000**; Lindblom High School alterations, addns., 6137 S. Wolcott Ave., **$300,000**; McKinley High School alterations, addn., **$500,000**; 3 story Morgan Park High School addn., 1744 Pryor Ave., **$300,000**; 1 story Neil School for crippled children, N. Damen and Winnemac Aves., **$750,000**; vocational school, 51 and State Sts., **$1,325,000**; 3 story Washburne Trade School addn., Clybourn Division and Sedgwick Sts., **$2,500,000**, funds authorized on foregoing projects; high school, Pratt and California Ave., **$1,250,000**; Avondale School, 2945 Sawyer Ave., **$360,000**; Brown School, 175 St. and Warren Ave., **$410,000**; Ericsson School, 2930 W. Harrison St., **$400,000**; 3 story Farren School addn., 5030 S. Wabash Ave., **$180,000**; Jenner School addn., **$150,000**; LaSalle School addn., 426 W. Eugene St., **$260,000**; Lincoln School addn., 2324 Geneva Terrace, **$180,000**; Logan School, 2238 N. Oakley Ave., **$200,000**; 2 story Manierre School, 1420 Hudson St., **$200,000**; Mulligan School, 1855 N. Sheffield Ave., **$250,000**; Ross School addn., 6059 Wabash Ave., **$250,000**; Shakespeare School addn., 1119 E. 46 St., **$240,000**; 2 story Sherwood School, **$230,000**; Webster School addn., 3315 Wentworth St., **$260,000**; Schiller School, 700 W. Scott St., **$260,000**; 3 story, vocational school, W. 36 St. and Sangamon, **$1,250,000**; 3 story Steinmetz High School addn., 3030 N. Mobile Ave., **$863,000**; 3 story, Taft High School addn., 5635 N. Natoma Ave., **$200,000**; high school, Minnehaha and Ionia Aves., **$1,250,000**; commercial high school, Elm and State Sts., **$1,000,000**; Anderson school addn., 1155 N. Wolcott St., **$180,000**; Burr School addn., Marshfield and Wabansia Aves., **$160,000**; Calhoun School, 2850 W. Jackson Blvd., **$240,000**; Gillespie School, 93 and State Sts., **$250,000**; Grant School addn., 2433 Wilcox St., **$320,000**; Hayes School, 258 N. Leavitt St., **$340,000**; Nettlehorst School, 3252 Bway., **$300,000**; Newberry School addn., 700 Willow St., **$180,000**; Ravenswood School addn., 4332 N. Paulina St., **$200,000**; Skinner School, Adams and Throop Sts., **$410,000**; Plamondon School addn., California and 16 Sts., **$210,000**, no funds authorized on foregoing projects.

★**Ill., Chicago** — Bd. Educ., 228 N. LaSalle St., preliminary plans by J. C. Christensen, 228 N. LaSalle St., Farragut High School addn., 2339 Christiana Ave., **$350,000**; Harrison High School addn., 2850 W. 24 St., **$250,000**, funds authorized; McLaren School, 1500 Flournoy St., **$475,000**; Knickerbocker School, 2301 N. Clifton Ave., $360,000, no funds authorized.

Ill., Chicago—City, Bureau of Arch. & Bldg. Maintenance, City Hall, plans by P. Gerhardt, Jr., city archt., City Hall, 14 high speed elevators at City Hall Bldg. **$400,000.** Financing not provided.

★**Ill., Chicago**—City, Dpt. Health, City Hall, plans by P. Gerhardt, Jr., city archt., City Hall, general and research laboratory, **$470,000**; 200 bed hospital, **$1,440,000**; outpatient clinic, adjacent to proposed hospital, **$900,000**; infant welfare stations, **$1,500,000**; bldg., providing quarters for various sections Health Dpt., **$2,100,000.** Financing not provided.

★**Ill., Chicago**—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, armory, **$4,183,140.** Financing not provided. CD 7/10/41—ENR 7/17/41.

★**Ill., DeKalb**—Dpt. Registration & Educ., Executive Offices, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, library for Northern Illinois State Teachers College, **$600,000.** Land rights not cleared, financing not provided. CD 2/17—ENR 3/9.

Ill., Dixon—Dpt. P. Welfare, Executive Offices, Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, 2 units childrens group, Illinois State Hospital, **$268,000.** Financing not provided. CD 2/14—ENR 3/8.

Ill., East St. Louis—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, armory, **$473,46**[illegible] Financing not provided.

Ill., Galva—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, armory, **$380,630.** Financing not provided.

Ill., Joliet—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, armory, **$344,217.** Financing not provided.

★**Ill., Kankakee**—Dpt. P. Welfare, Executive Offices, Springfield, plans by C. H. Hammond, state superv. archt., Springfield, power plant, incl. piping, utilities, $1,796,000. Financing not provided. CD 2/14—ENR 3/8.

Ill., Kewanee—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, armory, **$344,217.** Financing not provided.

Ill., Macomb—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, armory, **$407,048.** Financing not provided.

Ill., Moline—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Springfield, armory, **$350,025.** Financing not provided.

Ill., Normal—Dpt. P. Welfare, Executive Offices, Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, hospital school for physically handicapped children, **$420,000.** Financing not provided.

Ill., Ottawa—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Springfield, armory, **$344,217.** Financing not provided.

Ill., Paris—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, armory, **$330,978.** Financing not provided.

Ill., Springfield—Div. Standards, Dpt. Agriculture, Armory Bldg., plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, central tank truck calibration station, **$211,005.** Financing not provided.

Ill., Springfield—Illinois Armory Bd., Armory Bldg., plans by C. H. Hammond, state superv. archt., Armory Bldg., armory, **$441,241.** Financing not provided.

Ill., Sterling—Illinois Armory Bd., Armory Bldg., Springfield, plans by C. H. Hammond, state superv. archt., Armory Bldg., Springfield, armory, **$344,217.** Financing not provided.

Md., Sabillasville—State Tuberculosis Sanatoria, Sabillasville, plans 25% completed by Buckler & Fenhagen, 325 N. Charles St., Baltimore, brick, hollow tile addnl. bldg. **$150,000.** J. Posey, 10 E. Pleasant St., Baltimore, mechanical engr. Court Snyder & Grandall, 20 E. Lexington St., Baltimore, structural engr. CD 12/13—ENR 12/28.

★**Minn., Minneapolis**—City, Bd. P. Welfare, P. C. Phillips, bus. administrator, City Hall, sketches completed by Long & Thorshov, 1200 2 Ave. S., 3 story, concrete, brick, General Hospital addn., 5 St. between 6 and 7 Aves. **$1,000,000.** CD 11/24/43—ENR 12/2/43.

Minn., Minneapolis—City, Bd. P. Welfare, I. C. Phillips, bus. administrator, City Hall, plans by Long & Thorshov, 1200 2 Ave. S., 7 story, bsmnt., concrete, brick, steel public-health center, parking garage, 4 St. between 2 and 4 Aves. S. **$1,000,000.** CD 11/24/43—ENR 12/2/43.

★**N. Y., Brooklyn**—Dpt. Parks, Div. Museum & Institutions, Arsenal Bldg., 64 St. and 5 Ave., Central Park, New York, preliminary plans completed by A. M. Brown, 150 E. 61 St., New York, Zone 21, and W. Lescoze, 211 E. 48 St., New York, Zone 17, new bldg., children's museum, Brooklyn Institute of Arts & Sciences, **$1,100,000.** Financing not provided. CD 12/28/43—ENR 2/4/43.

N. Y., Buffalo—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans under way Buffalo Office Bldg. addn., **$165,000.** Financing not provided. Div. Architecture, C. J. White, comr., State Office Bldg., Albany, Zone 1, engr. CD 10/27—ENR 11/16.

N. Y., New York—Dpt. P. Wks., Municipal Bldg., Zone 7, plans completed by Mayer & Whittlesey, 31 Union Square, Zone 3, 4 story health center, 188 St. between Webster and Park Aves. **$290,000.** Financing not provided. CD 3/6—ENR 3/23.

Okla., Oklahoma City—City, City Hall, plans 5 percent completed, fire station for northwest portion of city, $150,000. Financing not provided.

Ore., Coquille—School Dist. 8, Coquille, R. T. Slater, chn. School Bd., plans by Stokes & Allyn, Hughes Bldg., Portland, 2 story, rein.-con., high school addn. Election June 22 on financing.

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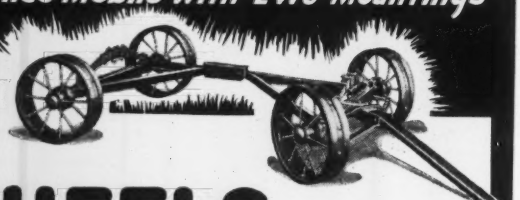

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POSTWAR PROJECTS (Cont'd.)

★**Ore., Corvallis**—State Bd. Higher Edu Eugene, plans by Jones & Marsh, Wo lark Bldg., Portland, 3 story, 56x10 and 70x160 ft. electrical engineering bldg $250,000; plans by Stanton & Johnston, Ha way Exchange Bldg., Portland, agricultur and dairy bldg., **$370,000**, both at Ore State College. Financing provided. 2/14—ENR 3/8.

★**Tex., Goose Creek**—Goose Creek Ind pendent School Dist., Goose Creek, pla by Hedrick & Linsley, 811 So. Stand Bldg., Houston, recreation bldg. and cen $500,000; 2,500 seating capacity auditori $250,000. Financing not provided. 11/5/43—ENR 11/11/43.

★**Tex., Houston**—University of Hous 4901 St. Bernard St., plans 25% co pleted by A. C. Finn, Bankers Mtg. Bl administration and auditorium bldg. $1,200 000. Financing provided. CD 3/23—EN 4/5.

Tex., McAllen — McAllen Independe School Dist., McAllen, plans by B. Cock 1504 Milam Bldg., San Antonio, gramm school, **$150,000**; gymnasium bldg. and co version existing 3 story, brick bldg. to Industrial-Agriculture Arts and Gym-Au torium Bldg., **$150,000**. Financing not pr vided.

Vt., Barre—City, School Bd., City Ha sketches by Hudson & Ingram, 9 Buell S Hanover, concrete, brick, stone. Spanish High School addn. To exceed **$200,000**.

Wash., Colfax—School Bd., R. E. Osbor school supt., Colfax, plans by G. M. Rasq & Sons, Washington Trust Bldg., Spokane 2 schools, **$150,000** each and high scho **$250,000**. Financing provided. CD 3/22 ENR 4/5.

Wyo., Cheyenne—School Dist. 1, Cheyenn plans by F. H. Porter, 423 E. 16 St., scho gymnasium, auditorium, **$300,000**.

ADVANCED TO ACTIVE STATUS

Calif., Santa Monica—Bd. Educ., San Monica, project cancelled, 1 story, fram stucco Grant School addns., $150,000. Wo now going ahead. J. M. Estep, 236 24 St archt. CD 12/28—ENR 1/11.

Tex., Raymondville—Raymondville Ind School Dist., Raymondville, project can celled, school, $150,000. Work now going ahead. CD 3/1—ENR 3/28.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Oakland—Labor Temple Assn. Alameda Co., Inc., 2111 Webster St., story, 100x160 ft. labor temple, **$400,000**.

★**Calif., Sacramento**—J. Jensen, 817 Swan son Dr., about 500 homes and shopping center. **$3,500,000.**

★**Calif., San Carlos**—H. Christensen, 139 21 Ave., San Francisco, about 100 resi dences on half-acre sites, **$1,000,000.**

★**Calif., Woodside**—H & D Hoefler, 765 El Camino Real, Redwood City, 100 resi dences. **$1,000,000.**

★**Ga., Atlanta**—Piedmont Hotel, B. Mad dox, mgr., 20 story addn. **$500,000.** Site purchased.

★**Idaho, Nampa**—Northwest Nazarene Col lege, L. T. Corlett, pres., Nampa, 8 bldgs. incl. women's dormitory, education bldg. fine arts center, auditorium, gymnasium science hall, student union and recreation bldgs., and central heating plant. **$700,000.** Financing available.

Ill., Elmhurst—DuPage Theatre Corp. G. J. Kappus, pres., c/o York Theatre N. York St., 1,600-seat brick, concrete, steel etc. motion picture theatre fronting York St. Over **$150,000** with equip. Site pur chased.

Ind., Indianapolis—Church of Christ (N King, Rev. J. Somes, pastor, 1827 Kessler Blvd. E Dr., school, Norwaldo Ave. at Kessler Blvd., and home for sisters. **$150,000.**

Ind., Indianapolis — North Methodist Church, 3 at Central Sts. modern educational unit. **$250,000** or more.

Ind., New Castle—First Christian Church New Castle, church with educational annex and recreational unit. **$150,000.** Site pur chased.

Mich., Jackson—Foote General Hospital Jackson, plans under way nurses home **$165,000.**

Mo., St. Louis—Gethsemane Lutheran Church, Augustana Synod, Rev. K. A. Hedeen, pastor, 3118 St. Vincent Ave., Zone 4, church and parsonage, etc., on Hampton and Mardel Aves., Zone 9. **$150,000** incl. equip., etc. Site purchased.

★**N. Y., Brooklyn**—Jewish Sanitarium & Hospital for Chronic Diseases, E. 49 St. and Rutland Rd., Zone 3, hospital. **$1,000,000.**

★**N. Y., Brooklyn**—Packer Collegiate Institute, 170 Joralemon St., Zone 2, new wing containing auditorium and gymnasium **$500,000.** Financing not provided.

N. Y., Long Island City—M. G. Ittelson & J. R. Schiff, 270 Madison Ave., New York Zone 16, 3 story garden type apartment houses on block bounded by Woodside Ave., 39 Rd., 39 Ave. and 52 St. Over **$150,000.**

LIKE A CHAMPION SKIER...

FORM-SET ROPE IS *relaxed*

He races down the hillside, quickly gathering speed. Almost nonchalantly, the skier does his turn at a breakneck pace as plumes of feathered snow swirl up and away. He's graceful, effortless, sure . . . because he's *relaxed.*

There's a great deal of that same relaxed quality in Form-Set rope. Form-Set is Bethlehem's preformed, and wire rope in the preformed construction has been relieved of many internal stresses and strains; freed of the locked-in tension that sometimes shortens rope life.

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There's real dollar value in Bethlehem Form-Set. On scores of applications subjecting the lines to serious bending fatigue, the preforming process actually adds rope life. This saves you money in the long run. Why not prove it to your own satisfaction with a trial length of Form-Set*—the rope that's *relaxed?*

**All grades, constructions, and sizes of Bethlehem Wire Rope can be supplied with the Form-Set feature.*

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The greedy jaws of Brownhoist clamshell buckets speed up material handling in dirt, clay, coal, gravel and ore. Their deep, clean bites practically eliminate hand shoveling. Extra sturdy. Large sheaves reduce rope wear to a minimum. AVAILABLE IN ROPE-REEVE, POWER-WHEEL AND LINK-TYPE. For facts and prices write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York City, Philadelphia, Pittsburgh, Cleveland and Chicago.

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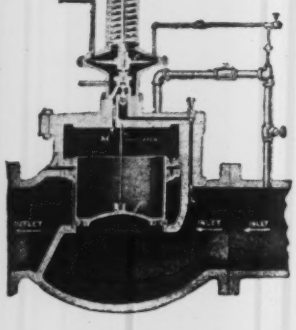

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POSTWAR PROJECTS (Cont'd.)

N. Y., New York—Dollar Savings Bank, 3 Ave. and 147 St., bank, 149 St. and Courtlandt Ave. Over **$150,000.** Financing provided.

N. Y., New York—J. J. Lese, 47[illegible] 5 Ave., 100 x 100 ft. apartment 106-114 E. [illegible] St. Over **$150,000.**

★**N. Y., New York**—New York Academy of Medicine, 2 E. 103 St., Zone [illegible] 9 story library addn. **$500,000.** Financing not provided.

N. Y., New York—Owner c/o Webb & Knapp, 383 Madison Ave., Zone 17, department store, 117-31 W. 33 St. Over $150,000. Site acquired.

N. Y., White Plains—D. S. Meister, 292 Madison Ave., New York, Zone 17, apartment Old Mamaroneck Rd. and Moulton Ave. Over **$150,000.**

Okla., Bartlesville—Young Women's Christian Assn., Mrs. E. Martin, pres., Bartlesville, new Y.W.C.A. bldg. **$160,000.** Financing not provided.

★**Pa., Newtown**—George School, Newtown, teachers quarters, **$150,000**; auditorium, **$150,000**; gymnasium, **$150,000**; shop bldg., **$50,000.** 30% funds provided.

S. C., Hartsville—Coker College, D. [illegible] Agnew, pres., Hartsville, library, music hall and imprv., enlarging bldg. **$350,000.** Financing not provided.

Tex., Abilene—Abilene Christian College, Abilene, college dormitory, **$150,000.** Financing not provided. CD 2/7—ENR 3/22

★**Tex., Abilene**—Hardin-Simmons University, Wm. R. White, pres., Abilene, J. D. Sandefer Memorial Bldg., **$350,000**; dormitory for women, **$250,000**; student center bldg., **$150,000**; addns. and modernization brick campus bldgs., **$200,000.** Financing not provided. CD 12/29/43—ENR 1/13/44

Tex., Brownwood—Coggin Ave. Baptist Church Congregation, Brownwood, reconstructing church on existing site. $150,000. Financing not provided.

Tex., Dallas—Franklin Stores Corp., 1610 Elm St., 5 story, bsmnt. commercial bldg., etc. **$150,000.** Financing provided.

Tex., Dallas — Zion Evangelical Lutheran Church, 2621 Swiss St., church, $150,000. Financing not provided.

Wash, Vancouver—Vancouver Community Hotel Corp., Vancouver, 5 story hotel addn. **$175,000.** Financing provided.

PLANS UNDER WAY

Calif., Los Angeles—Mullen & Bluett, 600 S. Bway., plans by Stiles Clements, 1138 Van Nuys Blvd., 3 story and 7 story tower, 131x168 ft., rein.-con. store bldg., incl. air conditioning, parking areas, etc. Wilshire Blvd. and Ridgeley Dr. Approx. $250,000. CD 8/17—ENR 9/7.

Calif., Los Angeles—W. S. Rosecrans, Inc., 1151 S. Bway., preliminary plans by Stiles Clements, 1133 Van Nuys Bldg., 2 story bsmnt., 100x150 ft., bldg. and another bldg. for store purposes, Wilshire Blvd. and Fairfax Ave. **$350,000.**

★**Calif., Los Angeles**—Sears Roebuck & Co., 2650 E. Olympic Blvd., plans under way 3 story addn. to portions existing bldg. 2650 E. Olympic Blvd., making entire bldg. 9 story. **$900,000-$1,000,000.** Bowen & Rowe, 2835 Gilroy St., consult. engrs.

Calif., Redwood City—Owner, [illegible] S. Oleson, Main and Middlefield Rd., plans by A. D. Janssen, Austin Ave. and Patricia Dr., Atherton, 3 story, rein.-con. ultra modern hotel having lobby and 4 stores on ground floor. **$300,000.**

★**Calif., San Gabriel**—Roman Catholic Archbishop of Los Angeles, preliminary plans by Barker & Ott, 624 S. LaBrea Ave., Los Angeles, hospital for mental patients, known as Rancho San Juan de Dios, on 32 acre site on south side of San Gabriel Blvd., near Hill Dr., near here. **$500,000.**

★**D. C., Wash.**—Owner, c/o E. Burton Corning & R. G. Moore, archts., 1621 20 St. N.W., plans 50% completed hotel and apartments temporarily known as Temple Terrace Development, at Connecticut and Florida Aves. N.W. **$12,000,000-$14,000,000.** Pierre Ghent, Engineers, 1625 Connecticut Ave. N.W., engrs.

Ill., Bloomington — Wesley Methodist Church, to be merger of First Methodist, 113 E. Grove St., and Grace Methodist, plans by Hooton of Shaeffer & Hooton, 710 Peoples Bank Bldg., church, Sunday school unit, church parlors, dining room and chapel. **$300,000-$400,000.** Financing provided.

★**Ill., Chicago**—Loyola University, 6525 Sheridan Rd., preliminary plans by G. A. Barry, 28 E. Jackson Blvd., 8 story, brick, steel, stone, concrete medical and dental school. **$1,500,000.**

La., Houma—The Ellender Memorial Hospital, Houma, plans by Wogan & Bernard, Baronne Bldg., New Orleans, hospital.

La., New Orleans—Seaman's Town House, 535 Decatur St., plans under way seaman's town house above Canal St. $200,000. Financing provided.

Mass., Holyoke—Owner c/o W. E. Dibble, archt., 25 Harrison Ave., Springfield, sketches concrete, brick, stone Jewish community center, gymnasium and synagogue. To exceed **$150,000.**

POSTWAR PROJECTS (Cont'd.)

Mo., St. Louis—St. Malachy's Day and Community Center, Rev. R. W. Warner, S.J., pastor, 2904 Clark Ave., Zone 3, plans by A. F. and A. Stauder, 3608 South Grand Blvd., Zone 18, day nursery and community center bldg., at Clark and Garrison Aves. $150,000. Financing not provided.

N. J., Camden—West Jersey Homeopathic Hospital, F. B. Bait, supt. and bus. mgr., Mt. Ephraim and Atlantic Aves., plans by G. Von Uffel, 30 Warwick Ave., Haddonfield, hospital alterations, addns. $190,000. Financing not provided.

★**O., Tiffin**—Heidelberg College, Tiffin, plans by Bellman, Gillette & Richards, 518 Jefferson St., Toledo, 3 story residence hall for 125 students, chapel, science, health and physical education bldgs., home management house, fine arts bldg., college infirmary and campus beautification. $1,000,000. CD 3/21—ENR 3/8.

★**Pa., Haverford Twp.** — Warner-West Corp., 7052 Garrett Rd., Upper Darby, preliminary plans under way 500 detached homes on 100 acre site, Earlington Rd. and city line. $5,000,000. Financing provided.

R. I., Pawtucket — Memorial Hospital, Prospect St., plans by Monahan & Meikle, 155 Main St., brick, steel hospital bldgs. $400,000. Financing not provided. CD 12/21—ENR 1/11.

Tex., Houston—Pine Forest Country Club, 721 W. 39 St., plans 50% completed by J. Bredemus, 721 W. 39 St., country club bldg., facilities, incl. 18-hole golf course. $250,000. Financing not provided.

Tex., Houston—P. R. Plumb & N. H. Mitchell, 4522 Griggs Rd., plans 25% completed 2 story apartment hotel, containing 128 units, on 4½ acre site at Almeda Rd. and Old Spanish Trail just purchased. $250,000. Financing provided.

Tex., San Antonio—St. Marys University, Cincinnati Ave., plans by L. M. J. Dielmann, 145 North St., 3 story, science bldg. $300,000. Financing not provided. CD 6/7—ENR 6/15.

Wis., Milwaukee—Capitol Drive Lutheran Church, 381 N. 52 St., Zone 10, sketches by Armstrong, Furst & Tilton, 11 S. LaSalle St., Chicago, Ill., church. $200,000. Financing not provided. CD 10/5/44—ENR 10/19/44.

READY FOR BIDS

N. Y., Brooklyn—Bond Clothing Stores, 261 5 Ave., New York, Zone 16, plans completed by L. A. Abramson, 25 W. 45 St., New York, Zone 19, 4½ story store, Fulton St. and Gallatin Pl. $450,000. Financing provided.

N. Y., New York—Morewood Realty Corp., 551 Fifth Ave., plans completed by Wm. Eipel, 101 Park Ave., Zone 17, altering Saks-34 St. Department Store, escalators replacing elevators, 3 new elevators, $300,000.

Tex., Dallas—J. Curtis Sanford, Lawther Dr., plans completed constructing restaurant, W. Commerce St., and Industrial Blvd. $150,000. Financing provided.

CONTRACTS AWARDED

★**N. Y., New York**—Presbyterian Hospital in City of New York, 620 W. 168 St., Zone 32, altering hospital bldgs., incl. 2 wings for school of nursing, addnl. rooms for Harkness Pavilion, Babies Hospital and the Eye & Neurological Institute, to Vermilya-Brown Co., Inc., 100 E. 42 St., Zone 17, $4,000,000. James Gamble Rogers, Inc., 70 E. 45 St., Zone 17, archts.

★**R. I., Warwick**—American Home Builders, 74 Brookside Dr., Cranston, 100 frame post war homes, West Shore Rd. section, to J. Mansolillo, 74 Brookside Dr., Cranston. Est. $550,000.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ind., Frankfort—CREAMERY—Schlosser Bros., Inc., Frankfort, 1 and 2 story creamery, Monon Ry. and Kyger St. $100,000. Site secured.

Mass., Watertown — PLANT — Kimball Lumber Co., 148 Waltham St., rebuilding and constructing brick plant addn. $50,000. Financing provided. CD 3/22—ENR 4/5.

Mo., St. Louis—TRUCKING TERMINAL—Schaum Transfer Co., 316 Lesperance St., Zone 4, trucking terminal. Over $40,000 incl. equip. Site purchased.

N. J., Belleville—TRUCK TERMINAL—Hoffman's Motor Transport Co., 514 Washington Ave., motor truck terminal bldg. Over $50,000.

N. J., Newark—STORAGE—Blackburn Products Co., 24 Ave. B, 1 story, brick, steel storage bldg. addn. $45,000.

★**O., Hamilton** — PLANT — Fisher Body Div., General Motors Corp., General Motors Bldg., Detroit, Mich., 1 story main plant providing 1,200,000 sq. ft. floor space, tool and die shop, on 145 acre site near southern city limits, $4,000,000-$20,000,000.

R. I., Providence—FACTORY—Owner, c/o O. Di Sala, archt., 703 Gardner Bldg., sketches 2 story, 80x100 ft., rein.-con. factory, Hway., Bourne St. and Atwells Ave. $65,000. Financing not provided.

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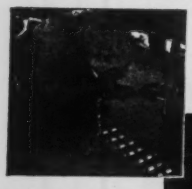

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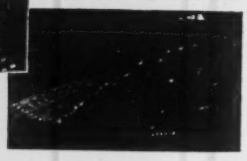

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POSTWAR PROJECTS (Cont'd.)

★**Tex., Tyler**—PLANT—R. E. Smith, et al, Tyler, plastic mfg. plant, $500,000. Financing not provided.

Utah, Salt Lake City — WAREHOUSE, etc.—Zion's Cooperative Mercantile Institution, H. H. Bennett, secy.-treas., 15 S. Main St., warehouse, garage, new elevators and remodeling store bldg. $500,000.

Que., Montreal—PLANT—Blackburn Aircraft, Ltd., London, England, plant construction. $150,000.

PLANS UNDER WAY

Md., Baltimore — PLANT, etc. — Deivale Dairies, Inc., 2030 Harford Rd., sketches completed by Eubank & Caldwell, Boxley Bldg., 416 S. Jefferson St., Roanoke, Va., 1 story, 76x111 ft. ice cream plant and 1 story, 60x111 ft., garage. $125,000.

Mass., Hyannis — WAREHOUSE — Cape Cod Farms, Inc., West Barnstable, plans nearing completion by W. M. Gaffney, 43 Potter St., brick, concrete warehouse addn. To exceed $40,000.

Mass., Worcester — WAREHOUSE — S. Finkelstein, 233 Way St., plans nearing completion by J. Swartz, 37 Derby St., 1 story, bsmnt., concrete, brick warehouse, Burt St. $40,000.

Mass., Worcester—WAREHOUSE—S. Glazer, Furniture Co., 85 Green St., plans by J. Swartz, 37 Derby St., 3 story, bsmnt., 60x80 ft., brick, steel warehouse, concrete fdn. Green and Plymouth Sts. To exceed $50,000.

★**O., Toledo**—STATION—New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York, N. Y., preliminary plans completed by J. P. Gallagher, c/o owner, 1 and 3 story, 180 x 350 ft. union station, west of present structure at Wade St., with access by enclosed overhead structure 20 ft. wide spanning Emerald Ave., waiting room exten. over tracks with access to train platforms by stairways, $2,000,000-$2,500,000; rebuilding, paving train platforms and exten. roofs of platforms, $200,000.

★**Okla., Harrah**—GENERATING PLANT—Oklahoma Gas & Electric Co., 321 N. Harvey St., Oklahoma City, plans 10% completed new steam turbine unit addn. to generating plant, incl. boilers and turbine. Over $1,000,000. Legal obstacles to be overcome.

★**Pa., Phila.** — LABORATORY — Smith, Kline & French, Inc., 105 N. 5 St., preliminary plans under way pharmaceutical laboratory, 15 and Spring Garden Sts. $2,000,000. Financing provided.

S. C., Rock Hill—PLANT—Rock Hill Printing & Finishing Co., W. T. Jenkins, genl. mgr., Rock Hill, plans under way 2 story rayon bldg., $430,000; 4 warehouses, $78,000, both on Laurel and White Sts.

Tex., Houston — PLANT — Peden Iron & Steel Co., 70 N. San Jacinto St., plans under way steel plant unit, $150,000. Financing provided.

Wash., Colfax—PLANT—Coca Cola Bottling Co., 12 and Main Sts., Walla Walla, plans by E. G. Morgan & H. E. Crawford, 1st National Bank Bldg., Walla Walla, 100x180 ft., rein.-con. bottling plant. Over $40,000. Financing provided.

PROPOSED WORK

Mass., Fall River—FACTORY—J & J Corrugated Box Co., 192 Anawan St., plans completed by S. T. Dubitsky, 771 Rock St., brick, steel factory, Ferry St. Over $10,000. Financing provided. CD 3/7—ENR 3/22.

Mass., Quincy—GARAGE—White Brothers, 50 French St., plans completed by W. D. Luke, 19 Warner St., West Somerville, 1 story, 175x333 ft., brick garage, French St. $100,000.

R. I., Providence—FACTORY—H. Sandea, 509 Westminster St., plans completed by Jenks & Ballou, 2600 Industrial Trust Bldg., 1 and 2 story, 80x160 ft., brick, steel factory, $65,000. CD 2/13—ENR 2/15, under Industrial.

UNCLASSIFIED

PROPOSED WORK

Ill., Charleston—GRAND STAND, etc.—Dpt. Registration & Educ., Executive Offices, Springfield, 25 year program, concrete grand stand and field house, at Easton Illinois State Teachers College. $113,401. Land rights not cleared, financing not provided.

Ill., Chicago—FIRE ALARM SYSTEM—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, fire alarm sys. and distr., at Chicago State Hospital. $90,000. Financing not provided.

Ill., DeKalb—ATHLETIC FIELD, etc.—Dpt. Registration & Educ., Executive Offices, Springfield, 25 year program, athletic field, stadium, bleachers at Northern Illinois State Teachers College. $210,287. Land rights not cleared, financing not provided.

Ill., Elgin—FIRE ALARM SYSTEM, etc.—Dpt. P. Welfare, Executive Offices, Springfield, 25 year program, fire alarm sys., street and grounds lighting at Elgin State Hospital. $55,000. Financing not provided.

STWAR PROJECTS (Cont'd.)

Jacksonville—PLAYGROUND, etc.—P. Welfare, Executive Offices, Spring- 25 year program, playground and ath- field, at **State School** for the Deaf. ,000. Financing not provided.

Lincoln—FIRE ALARM SYSTEM, etc. pt. P. Welfare, Executive Offices, Spring- 25 year program, fire alarm sys. and phone sys., at Lincoln State School and ngs. **$45,000.** Financing not provided.

Manteno—STEAM TUNNEL, etc.—P. Welfare, Executive Offices, Spring- 25 years program, steam tunnel and ing extens., **Manteno** State Hospital. ,000. Financing not provided.

Quincy—FIRE ALARM SYSTEM, etc. pt. P. Welfare, Executive Offices, ngfield, 25 year program, electrical fire m and phone sys. alterations, addns., Soldiers & Sailors Home. **$32,300.** Financ- not provided.

Stateville (mail Joliet) — ELECTRI- DISTR. SYS.—Dpt. P. Safety, Armory g., Springfield, 25 year program, electrical r sys. exten., at Honor Farm. **$66,950.** ancing not provided.

Vandalia—ELECTRIC DISTRIBU- N SYSTEM, etc.—Dpt. P. Safety, Armory g., Springfield, 25 year program, electric r. sys. and telephone sys., **$51,500**; ven- ing sys., **$30,900**; railroad siding exten. power house site, **$51,500.** Financing not vided.

Mass., Montague—SWIMMING POOL—n Bd. Selectmen, Town Hall, concrete mming pool. **$25,000.** Financing not pro- ed.

Mass., West Springfield — ATHLETIC LD—Town, H. D. Johnston, chn. Bd. ectmen, 107 Colton Pl., Longmeadow, letic field at Eastern States Exposition unds. To exceed **$25,000.**

Mo., Kansas City—CAR PARKS—City and Merchant Assn., City Hall, civic car ks, 13 St. and Grand Ave. **$306,000-**6,000; 13 St. Main to Walnut Sts. **$432,000-**8,000; 14 St. and Baltimore Ave. thru to n St., **$235,000-$282,000**; 10 and McGee , 10 and Main Sts. exten. to 9 St., 0,000-$125,000.

Tex., Texas City—AIRPORT—Town, air- t imprvs., runways, hangars, etc. **$75,000.** ancing provided. CD 1/19—ENR 3/22.

Wash., Seattle—PARK IMPROVEMENTS —Seattle Park Dpt., County-City Bldg., nd James, Zone 4, imprv. grounds at odland Park, **$191,000**; repairing, imprv. kson Golf Course, **$62,000**; handball and leyball courts, wading pool, ground prvs., Ravenna Playfield, **$7,600**; Mont- e playfield imprvs., **$8,350**; Maple Leaf yfield imprvs., **$8,100**; Froula Playfield prvs., **$4,600**; water drainage sys., road- y and parking area, tennis courts, land- ping, Ravenna Park, **$24,000**; paths and dways, Washington Park, **$24,000**; shelter se and social center, surfacing tennis rts, wading pool, retaining wall, etc., versity Playfield, **$23,000**; handball rts, volleyball court, gymnasium, wading l, retaining walls and paved roadway at urelhurst playfield, **$41,000**; concrete ten- courts, beach steps and addn. to field- se, Green Lake playfield, **$26,105**; boat cession facilities, illuminated floating ntain and water supply line at Green e Park, **$107,600**; new bldgs. and repairs Woodland Park Zoo, **$445,000**; widening, rfacing Lake Washington Blvd., **$225,-**; curbs and water sys. for Ravenna Blvd., ,250. Financing not provided. CD 9/9/43 ENR 9/16/43.

ANS UNDER WAY

Calif., Lodi—STREET LIGHTING SYS- M—City, City Hall, modernization street ting sys. **$60,000.** Financing not provided. L. White, City Hall, city engr. CD 8/31/43 ENR 9/2/43.

Mass., North Adams—SWIMMING POOL—. C. E. O'Brien, mayor, City Hall, plans completed outdoor swimming pool. 000. Financing provided. J. R. Hamp- 30 Backman Ave., Pittsfield, archt. 1/31—ENR 3/8.

N. Y., Flushing—PARK DEVELOPMENT —Dpt. Parks, R. Moses, comr., Arsenal dg., 64 St. and 5 Ave., Central Park, New k, plans 75% completed park develop- nt, Flushing Meadow. **$4,000,000.** Financ- not provided. S. Constable, Arsenal Bldg., w York, ch. park designer.

Tex., Goose Creek—SWIMMING POOL—se Creek Ind. School Dist., Goose Creek, n-con. swimming pool. **$75,000.** Financ- not provided. Hedrick & Lindsley, 811 Standard Bldg., Houston, archts. CD 43—ENR 9/9/43.

ADY FOR BIDS

Mo., Robertston—AIRFIELD BLDGS.—City of St. Louis, c/o M. M. Kinsey, pres. Pub. Serv., 304 City Hall, St. Louis, e 1, plans completed administration and minal bldg., at Lambert-St. Louis Mun- pal Airport, at Bridgeton, to be either 1 y, 42x11,350 **ft. and 3 story,** tower and ked by **passage crossing to concrete** apron field **$950,000,** Engineers Bd. P. Serv., 301 y Hall, Zone 1, engrs., or 2 large bldgs., ked by passageway crossing roadway with course containing 2 wings, 3 story, con- ing garage, restaurant, small hotel, post e, etc., **$1,450,000,** B. McMahon, c/o ner, archt.

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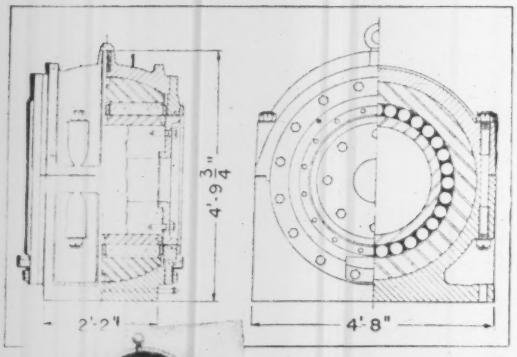

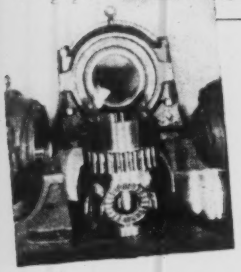

Photograph and X-section show 47½" O. D. Torrington Self-Aligning Roller Bearing for trunnions of Chicago's new bascule-type North State Street Bridge. Some of America's largest movable bridges operate on bearings engineered and manufactured by Torrington's Bantam Bearings Division.

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ELSIE EAVES, Manager *SCOTT McLEOD, Statistics* *J. A. MAHONEY, Reports*

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WATER SUPPLY

PROPOSED WORK

Ala., Opelika—City, City Hall, filtration plant, incl. filter, concrete storage basin, elevated steel storage tank lines, pumps, bldgs. Polglaza & Basenberg, Empire Bldg., Birmingham, engrs.

Ark., Bearden—W. P. Brewster, mayor, City Hall, water well for housing, Ark. 3192. $19,500. Applied for FWA funds. M. Z. Bair, Pine Bluff, engr.

La., New Orleans—Sewerage & Water Bd. of New Orleans, 526 Carondelet St., clear water reservoir for Algiers Purification plant. Over $75,000.

Mo., Marshall—City, J. W. Sparks, mayor, voted bonds enlarging water sys. $450,000. Black & Veatch, 4706 Bway., Kansas City, Mo., engrs. CD 2/9—ENR 2/17.

Pa., Barnesboro — Boro, Maretta Davis, secy., Municipal Bldg., surveys soon, 500,000 gpdc. concrete, brick filtration plant. $50,000. Morris Knowles, Inc., Park Bldg., Pittsburgh, engr.

R. I., Barrington—Bristol County Water Co., 553 Hope St., Bristol, elevated water storage tank. $26,500.

R. I., Warwick—City, C. D. Lamphear, chn., 13 Dartmouth St., preliminary survey water sys. Over $15,000. Fay Spofford & Thorndike, 11 Beacon St., Boston, Mass., engrs.

★**Tex., Dallas**—City, J. W. Rogers, mayor, preparing plans filter plant expansion. Approx. $690,000. Myers & Noyes, Tower Petroleum Bldg., engrs.

Tex., Dallas—City, City Hall, 12 and 8 in. c.i. watermains from Yale to Pecan Rd. Over $25,000.

★**Alaska, Fairbanks**—City, City Hall, water supply and distr. sys. $1,750,000. FWA allotment rescinded following War Dpt. disapproval of project. Black & Veatch, 4607 Bway., Kansas City, Mo., engrs. CD 2/21—ENR 10/19.

Ont., Alexandria—Municipality, filtration plant, $60,000. Pub. Utilities Comn., Alexandria, engr.

BIDS ASKED

Bids Asked April 24

†**Ga., Rome**—U. S. Eng., Post Office Bldg., Savannah, 350,000 gal. elevated wood water tank on 110 ft. steel tower at Battery General Hospital.

Bids Asked April 25

Pa., Huntingdon—C. M. Woolworth, secy. Dpt. Property & Supplies, Harrisburg, pressure grout relining reservoir, Pennsylvania Industrial School. Plans deposit $2.50.

Bids Asked April 26

Wash., Carbonado—Carbonado Water Dist., Carbonado, water distr. sys. $25,000. T. C. Breitenstein, Hoge Bldg., 2 and Cherry Sts., Seattle, Zone 4, engr.

Bids Asked April 27

Tex., Winters—City, T. A. Smith, mayor, City Hall, Contr. 2, pump station and water treatment plant at lake side; Contr. 3, 10 in. pipeline between pump. station and treatment plant, 8 in. line between treatment plant and water tower and removing, placing in pipeline 7,350 ft. 16 in. c.i. pipe, fittings, etc. Plans deposit, $25 each. Bids 4/6 rejected. CD 3/21—ENR 3/29.

Bids Asked April 27

Wash., Chelan—R. M. Pickett, town mgr., Town Hall, concrete reservoirs, 2,235 lin. ft. 8- to 12-in. c.i. pipe. $25,000.

Bids Asked April 30

Que., Sillery—Ch. Langlois, secy., Parish of St. Colomb de Sillery, 3 Maguire Ave., enlarging filtration plant from 500,000 to 1 m.g. per day, construct intake from St. Lawrence River and 200,000 gal. elevator type water reservoir. $225,000. Plans deposit $20. M. Gilbert, 5 Mont Joli St., Quebec City, engr. CD 10/15—ENR 10/12.

Bids Asked May 1

Okla., Clinton—City Clerk, City Hall, addnl. filter plant imprvs., watermain extens., pump. equip. $50,000. C. E. Bretz, 1300 Colcord Bldg., Oklahoma City, engr.

Bids Asked May 2

Wash., Kalama—City, City Hall, 14 x 22 ft. concrete pumphouse and concrete pit, 7,000 ft. 8 in. c.i. or asbestos cement distr. lines, 3 mi. electric lines. $75,000. Plans deposit $10. R. H. Corey, Corbet Bldg., Portland, Ore., engr. CD 3/7—ENR 3/15.

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads): BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Bids Asked May 10

Mass., Belchertown — Metropolitan Dist. Water Supply Comn., 20 Somerset St., Boston, furnishing, del. waterwheel, generator, switchgear, transformer, substation, appurtenances for Winsor Dam Power Plant. Plans deposit $5. K. R. Kennison, ch. engr.; adv. ENR 4/19.

Bids Asked

Sask., Punnichy—E. J. Midland, village clk., 2 water storage tanks, $16,000.

LOW BIDDERS

Calif., Inglewood—City, City Hall, Apr. 10, furnishing, laying 9,306 lin. ft. 6 and 12 in. c.i. main from Freeman Blvd. along Manchester Blvd. to Prairie Ave. and along Prairie Ave. from Manchester Blvd. to Arbor Vitae St., from E. Green, 3001 Coolidge Ave., Los Angeles, **$51,918.**

†**Calif., Richmond**—U. S. Eng., 74 New Montgomery St., San Francisco, water supply sys. and draft stops at Parr-Richmond Terminal, Spec. 1978-1, from P. Sorensen, 927 Arguello St., Redwood City, **$51,557.**

La., Algiers—Sewerage & Water Bd., 526 Carondelet St., New Orleans, Apr. 9, clear water reservoir for Algiers Purification Plant, Contr. 123-W, from Boh Bros. Constr. Co., 2400 Cypress St., New Orleans, **$204,989.** CD 3/29.

Mass., Braintree—Town Water Dpt., 793 Washington St., Apr. 10, installing about 11,825 ft., 12 in. c.i. water pipe on Route 128, from J. Williams, 8 Beechwood St., Dorchester (Boston), **$18,582.** Weston & Sampson, 14 Beacon St., Boston, engrs. CD 4/3—ENR 4/5.

Mass., Mansfield—Town, Town Mgr., Town Hall, laying approx. 3,350 lin. ft. 8 in. watermain and constructing 4 sludge beds at sewer plant, from R. Zoppo, 44 Ransdell Ave., Roslindale (Boston). Items *(1)* **$6,200** *(2)* **$2,400** *(3)* **$6,1000** *(2-A)* **$2,850** *(3-A)* **$7,250.** Whitman & Howard, 89 Broad St., Boston, engrs.

N. Y., Farmingdale—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, Apr. 11, pump house and pump, addnl. water supply at State Institution of Agriculture, for Dpt. Educ., Education Bldg., Albany, Zone 1, from Frye Co., 35-21 81 St., Jackson Heights, **$16,001.** CD 3/29—ENR 4/5.

Tex., Houston—City, c/o M. H. Westerman, secy., Apr. 12, installing 20 in. c.i. water line, Hutchins St., from J. G. Holland, Old Spanish Trail, **$54,851.** CD 4/3.

Tex., Littlefield—City, B. Phillips, mayor, City Hall, Apr. 9, WW imprvs., incl. concrete surface reservoir, pump. equip., pump houses, water and electric lines, from Panhandle Constr. Co., Lubbock, approx. **$30,000.** CD 3/28.

†**Tex., Temple**—City, A. E. Taylor, mgr., Temple, Apr. 12, WW imprvs., Tex., 41-708-N, from W. G. Cullum & Co., Great National Life Bldg., Dallas, **$147,640. FWA.** CD 3/29—ENR 4/15.

Wis., Eau Claire—City, Apr. 11, installing 13,510 ft. 24 and 30 in. c.i. mains, from D. Borre, 841 Sherwood Ave., St. Paul, Minn., **$201,056;** pump. station, from Edw. H. Meyer Const. Co., 75 Main St., Oshkosh, **$189,320*****control equip., from Electric Service Co., Ann Arbor, Mich., **$56,720.** CD 4/3—ENR 4/5.

CONTRACTS AWARDED

Ga., Macon—Bd. Water Comrs., Macon, installing watermains, appurtenances, to C. A. McDaniel, N. Trenholm Rd., Columbia, S. C., **$17,978.** CD 3/13—ENR 3/15.

Mass., Palmer—Town, Three Rivers Fire Dist., Town Hall, furnishing, laying watermain and furnishing, installing pump. equip. at pump. station, to R. Civitarese, 480 Metropolitan Ave., Hyde Park (Boston), **$19,278.** Bids 4/6, awarded 4/9. CD 3/27—ENR 3/29.

Ore., Portland—Westslope Water Dist., 9025 S.W. Canyon Rd., furnishing, installing 28,000 ft., 12 in. water supply line and 6- to 14-in. feeder and distr. mains, to Oscar Butler & Son, 4900 N.E. 42 St., **$109,995.** Est. $120,000. CD 3/27—ENR 3/29.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Los Angeles—Los Angeles Co., Hall of Records, vitr. clay sanitary sewers, involving 13,290 ft. main line, 4,720 ft. house connections, Coke Ave., etc., C. I. 1115. $40,000. A. Jones, Hall of Records, engr.

Calif., Ontario and Upland—Cities of Ontario and Upland, sanitary sewers and disposal plant. $50,000-$100,000. Currie Engineering Co., Andreson Bldg., San Bernardino, engr.

Calif., San Diego—City, Civic Center Bldg., outfall sanitary sewer line from treatment plant to San Diego Bay. $252,779. City Engineer, Civic Center Bldg., engr.

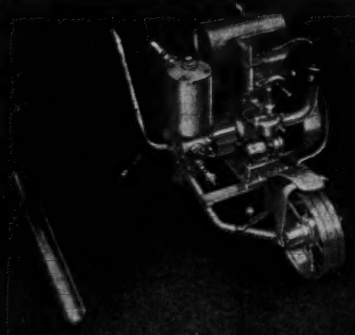
Calif., Torrance—City, City Hall, installing sanitary sewers, in Pueblo Dist. $30,000. Los Angeles County to pay 48% of cost, balance from assessment dist. $30,000. City Engineer, engr.

Ill., Ottawa—City, City Hall, approx. 2,900 ft. covered or closed storm sewers, approx. 2,000 ft. open ditch, flood control works as may be necessary for protection from floods arising in Chestnut Creek Ravine, La Salle Creek Ravine and Goose Creek and their tributaries, within or adjacent to city. Seeking $55,000 appropriation approx. cost. T. B. Casey, ch. engr., Illinois Div. Waterways, 201 W. Monroe St., Springfield, engr.

Me., Portland—City, City Council, relocating, replacing sanitary sewer outlets. $100,000.

Mich., Pontiac—City, City Hall, sewage disposal plant, incl. oil removing equip., grit chamber. $75,000. Jones & Henry, Toledo Trust Bldg., Toledo, O., engrs.

Tex., Houston—City, M. H. Westerman, secy., City Hall, bids soon, sanitary sewers, $116,000.



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SEWERS, WASTE DISPOSAL (Cont'd.)

BIDS ASKED

Bids Asked April 24

Ga., Indian Springs—State Director, 411 State Capitol, Atlanta, sewage disposal plant, sewage imprvs., outfall lines, dosing tank and equip., etc. John J. Harte Co., Forsyth Bldg., Atlanta, engrs.

Bids Asked May 1

Okla., Clinton—City Clerk, City Hall, sewage disposal plant addns. $30,000. C. E. Bretz, 1300 Colcord Bldg., Oklahoma City, engr.

Bids Asked May 5

Mass., Marblehead—Sewer Comrs., Rechabite Bldg., lateral sewers. $25,000. Plans deposit $10. F. A. Barbour, 1119 Tremont Bldg., Boston, engr.

Bids Asked May 7

Calif., Santa Cruz—Santa Cruz Co., Court House, Twin Lakes sanitary sewer. $93,721. A. Baldwin, Courthouse, co. engr.

Bids Asked

†Okla., McAlester—City, sewage disposal plant unit, facilities, Okla. 34-204. $90,000. **FWA.** Collins Engineering Co., 326 Arnote Bldg., engr. CD 11/6—ENR 11/9.

LOW BIDDERS

†Colo., Denver—U. S. Eng., 909 17 St., Denver, addnl. storm sewer at Fitzsimons General Hospital, from Schwartz Constr. Co., Earhart Block, Colorado Springs, $98,174. CD 3/12—ENR 3/15.

Ill., Chicago—Sanitary Dist. of Chicago, 910 S. Michigan Ave., Apr. 12, installing replacement power unit, remote gate control and rehabilitation electrical conduits and wiring, from Divane Bros., 3826 W. Van Buren St., $28,628; Contr. 45-13 (CL-P), altering aeriation tank walls, Battery A, Calumet Sewage Treatment Works, from John C. Tully & Co., 33 N. LaSalle St., $97,458***Contr. 45-20 (Gen. M) furnishing, del. spare parts, appurtenances, for pump. equip. from Allis-Chalmers Mfg. Co., 135 S. LaSalle St., $25,429***Southwest Sewage Treatment Works, Contr. 45-12 (SW-P), replacing air diffusers, from G. D. Hardin, 3139 S. Indiana Ave., $41,498. CD 4/5.

D. C., Wash.—District Comrs., District Bldg., Apr. 9, stormwater sewers, East Capitol and 47 Sts. S.E., from Leo Butler Co., Silver Springs, Md., $62,333.

CONTRACTS AWARDED

Conn., Hartford—Bd. Contr. & Supply, Metropolitan Dist., 650 Main St., 15 in. sanitary tile sewers, 33 in. rein.-con. storm sewers, to F. B. O'Neil, 22 Preston St., $25,030. CD 3/26—ENR 3/29.

Pa., York—City, H. A. Seigler, dir. Streets and Pub. Imprvts., brick, concrete sewage plant addn., to Worthington Pump & Machine Corp., 400 W. Madison St., Chicago, Ill., $75,000. C. F. Wallow, City Hall, city engr. Albright & Friel, 1520 Locust St., Phila., engrs.

Wis., Sturgeon Bay—Sturgeon Bay Utilities, J. B. Johnson, supt., Sturgeon Bay, grit chambers, to J. Schlise, Sturgeon Bay, $30,399. Bids 3/24. McMahon Engrg. Co., Menasha, engr.

BRIDGES

PROPOSED WORK

Pennsylvania—Commonwealth of Pennsylvania, J. U. Shroyer, secy., Harrisburg, highway bridge over Dunning Creek, Bedford Twp., Bedford Co., $60,770.

BIDS ASKED

Bids Asked April 23

New Jersey and Pennsylvania—Delaware River Joint Comn., Administration Bldg., Bridge Plaza, Camden, N. J., repaving suspended spans on Delaware River between Camden, N. J., and Phila., Pa., Contr. 21-E. Plans deposit $10. CD 3/20—ENR 3/22.

Bids Asked April 25

Ia., Tipton—Bd. Supervs. Cedar Co., Tipton, one 180x22 ft., and one 120x22 ft., continuous I-Beam bridges, etc. Over $25,000. A. R. Bartell, Tipton, co. engr.

Bids Asked April 27

Mass., Falmouth—Bd. Selectmen of Falmouth, at State Dpt. P. Wks., 100 Nashua St., Boston, reconstructing Bowens Pond Bridge on Menauhant Rd., for Town, Dpt. P. Wks. and County Chap. 90 Proj. 90. $4,000. Plans deposit $5. Dpt. P. Wks., Commonwealth of Mass., 100 Nashua St., Boston, engr.

Bids Asked April 30

Rhode Island—Div. Purchases at office F. A. Adams, state purch. agt., State House, Smith St., Providence, Mendon Road Bridge No. 274, Diamond Hill Bridge No. 287 and Abbott Run Bridge No. 288 in Cumberland on proposed George Washington Hy. Exten., FAP PWS-1(15-A), Granite Mill Bridge No. 308 and Granite Mill Canal Bridge No. 309, in Burrillville, on Chapel St., Lebanon Mill Bridge No. 406, in Pawtucket on Central Ave., Providence Co., FAP-PWS-1 (29) and Riverpoint R. R. Bridge No. 244 in West Warwick on E. Main St., Kent Co., FAP PWS-1(30); adv. ENR 4/19.

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BRIDGES (Cont'd.)

Bids Asked May 1

Washington—C. E. Hickey, dir. State Hy. Dpt., Olympia, rein.-con. girder bridge over Jackman Creek on Secondary State Hy. 17-A, near Concrete, Skagit Co. Plans depopsit $2.

LOW BIDDERS

Mass., Boston—Dpt. P. Wks., City Hall, Apr. 10, construction work on Allston Bridge over Boston & Albany R.R., from A. Grandi, 44 Ellis Ave., Norwood, $29,965. CD 3/29—ENR 4/5.

★**Mo., Kansas City**—K. K. King, dir. P. Wks,. City Hall, Apr. 10, repairing, strengthening 1,726 ft. viaduct, incl. concrete, steel work, from Massman Constr. Co., New York Life Bldg., Kansas City, Mo., $749,132. CD 3/19—ENR 3/22.

West Virginia—State Rd. Comn., Charleston, Apr. 10, Malden Underpass, Briddge 1718, Kanawha Co., from Monty Bros., St. Albans, $27,180. CD 3/29—ENR 4/5, under Roads.

CONTRACTS AWARDED

Arkansas—State Hy. Dpt., Little Rock, temporary bridge across Ouachita at Camden, Ouachita Co., to Pioneer Constr. Co., Malvern, $46,456. Bids 3/4—CD 3/26—ENR 3/29.

Pa., Phila.—City Dpt. P. Wks., J. H. Neeson, dir., City Hall Annex, Grays Ferry Bridge, to Mundy Paving & Constr. Co., 226 S. Warnock St., $49,439. Awarded 4/6.

STREETS AND ROADS

BIDS ASKED

Bids Asked April 23

Connecticut—State Hy. Dpt., Wm. J. Cox, comr., Hartford, bituminous macadam paving 2,431 ft. East Granby. Plans deposit $2.38; graveling 5,395 ft. Simsbury, Plans deposit $3.23; 2,560 ft. Union, Plans deposit $2.55. Over $25,000.

Bids Asked April 24

Maryland—State Roads Comn., Baltimore, asphaltic concrete base course and wearing course surfacing 2.3 mi. Balto Wash. Blvd. from Patapsco River to Dead Mans Curve, Contr. Ho-219-1-311, Howard Co.; grading, drainage, bituminous base course surfacing 0.339 mi. Stephen Decatur Memorial Rd., Contr. WO 252-1-150, Worcester Co.

Bids Asked April 24

North Carolina—State Hy. & P. Wks. Comn., Raleigh, bituminous retreatment surfacing 33.8 mi. Betterment Sects. 6-6-51-157, 6-6-56-146, and 6-6-56-152, Davidson and Randolph Counties, $50,000–$75,000; 28.78 mi. Betterment Sects. 5-7-49-21, 5-6-40-156, 5-6-43-124, 5-6-123 and 5-6-46-163, Rockingham, Caswell and Guilford Counties, $50,000–$75,000; 31.32 mi. Betterment Sects. 6-6-51-152, 6-6-51-156 and 6-6-51-154, Davidson Co., $50,000–$75,000; sand asphalt surfacing 15 mi. Betterment Sect. 3-6-28-121, Brunswick Co., $75,000–$100,000; bituminous pavement mixture binder course, sand asphalt surfacing 6.9 mi. Betterment Sects. 3-6-32-117 and 3-6-32-118, New Hanover Co., $75,000–$100,000; 4 mi. Betterment Sect. 3-6-30-127, Cumberland Co., $25,000–$50,000. W. Vance Baise, Raleigh, engr.

Bids Asked April 25

Kansas—State Hy. Dpt., Syracuse, bituminous sealing 12.423 mi. Proj. 6516-AB, Wichita Co.; 20.165 mi. Proj. 6507, Finney Co.; 14.27 mi. Proj. 6508, Ford Co.; 24.139 mi. Proj. 6509, Grant Co.; 13.501 mi. Proj. 6510, Grant Co.; 25.572 mi. Proj. 6511-ABC, Kearny Co.; 17.205 mi. Proj. 6512-ABC, Ness Co.; 30.005 mi. Proj. 6513-ABC, Scott Co.; 12.929 mi. Proj. 6514-AB, Stanton Co.; 13.111 mi. Proj. 6515, Stevens Co.; bituminous material surfacing 4.5 mi. Proj. 6067, 11.314 mi. Proj. K-6068, both Hamilton Co.; resurfacing material 15.2 mi. Proj. 6517, Wichita Co. R. C. Keeling, Topeka, engr.

Louisiana—State Hy. Dpt., Baton Rouge, shaping, roadway, drainage structures, and sand clay gravel surfacing 16.9 mi. Sulphur-De Quincy Hy., State Route 104, Proj. 31-06-06, Calcasieu Parish; shaping road, bituminous surface treating 0.718 mi. Raceland-Lockport Hy., State Route 78, Proj. 64-06-14, LaFourche Parish; furnishing and spot dumping 8,400 cu. yd. washed gravel, Tensas Parish. D. Y. Smith, dir. Hys. Bids 3/7 rejected. CD 3/13—ENR 3/15 under LB.

Bids Asked April 26

Mass., Brighton (sta. Boston)—City of Boston, P. Wks. Dpt., City Hall Annex, Boston, sheet asphalt paving Cambridge St. $25,000.

Bids Asked April 27

Alabama—State Hy. Dpt., Montgomery, light penetration surface curb and gutter 17.775 mi. Sect. 7121-C and 7146-C, Houston and Dale Counties; tar of asphalt liquid seal 10.447 mi. Sect. 7101-A, Henry Co.; 9.337 mi. Sect. 7143-A, Dale Co.; 8.102 mi. Sect. 7708-A, Montgomery Co.; 11.728 mi. Sect. 7112-A, Henry Co.; base course and single surface treatment 9.223 mi. between Pine Hill and Catherine, MS-6132-A and 6133-A, Marengo and Wilcox Counties. Plans deposit $10.

Bids Asked April 27

Mass., Chatham—Bd. Selectmen of Chatham at State Dpt. P. Wks., 100 Nashua St., Boston, repairing hurricane damage to 5 sects. highway, for Town, State and County Chap. 90 Proj. $5,000. Plans deposit $5. Dpt. P. Wks., Commonwealth of Mass., 100 Nashua St., Boston, engr.

Bids Asked April 27

Mass., Dennis—Bd. Selectmen, Dennis, at State Dpt. P. Wks., 100 Nashua St., Boston, repairing hurricane damage to 5 sects. of hy., for Town, State and County Chap. 90 Project. $8,000. Plans deposit $5. Dpt. P. Wks., Commonwealth of Mass., 100 Nashua St., Boston, engr.

Bids Asked April 27

Mass., Yarmouth—Bd. Selectmen of Yarmouth at State Dpt. P. Wks., 100 Nashua St., Boston, repairing hurricane damage to 5 sects. of hy. $10,000. Plans deposit $5. Dpt. P. Wks., Commonwealth of Massachusetts, 100 Nashua St., Boston, engr.

Bids Asked April 27

Missouri—State Hy. Comn., Jefferson City, bituminous concrete surfacing 22.02 mi. Route 61, Sects. M 1 and M 2, Lincoln Co. over $25,000; 5.287 mi. Route 66 Sects. 1 and 2, Crawford Co.; 12.496 mi. Route 66, Sect. M 2, Phelps Co.; 10.497 mi. Route 40, Sect. M 1, Warren Co.; 18.238 mi. Route 66, Sects. M 1 and 2, Franklin Co.; 5.85 mi. Route 61, Sect. M 2; 4.73 mi. Route 40, Sect. M 1, both St. Charles Co., all foregoing over $25,000; 2.481 mi. Route 61, Sect. M 1, St. Charles Co., under $25,000. C. W. Brown, Jefferson City, ch. engr.

Bids Asked April 27

Minnesota — State Hy. Dpt., St. Paul, road-mixed bituminous wearing course, 32 mi. Maintenance Dist. No. 15, about 60 mi., Maintenance Dist. 16, $55,000; production mineral aggregate for bituminous surfacing crush, screen, load and haul about 26,255 cu. yd., at Morris, $30,000. O. L. Kipp, ch. engr.

Bids Asked April 30

†**Ga., Dublin**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., (selected bidders) exten. roads, walks and services, Naval Hospital, Spec. 16009.

Bids Asked May 1

Minn., Hallock—Kittson Co., A. P. Lofgren, aud., apply gravel surfacing on about 43 mi. county aid and state aid roads, 11 projects, 2,065 cu. yd. stripping, 17,615 cu. yd. crushing, screening and loading, 150,407 cu. yd. haul, $25,000. J. C. Adams, co. hy. engr.

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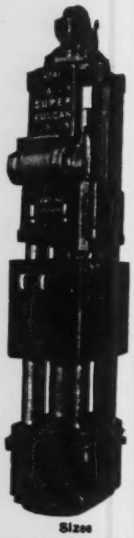

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STREETS AND ROADS, (Cont'd.)

Bids Asked May 1

Washington—C. E. Hickey, dir. State Hy. Dpt., Olympia, grading, surfacing, draining, oiling 7.43 mi. county road and Naval Installation Access Rd., Bangorm, Kitsap Co.; grading, surfacing, light bituminous surface treating 7.3 mi. Secondary State Hy. 9-B, and access road to Quillayute Naval Air Station, Quillayute, Clallam Co. Plans deposit $2 each.

Bids Asked May 2

California—State Div. Hys., Sacramento, grading, concrete and asphaltic concrete paving 0.3 mi. at entrance to Hamilton Field, Marin Co.; grading, applying bituminous surface treatment 8.2 mi. between Route 145 near Rademacher and Inyokern-Trono Rd., Kern Co.; applying seal coat to portions, repairing other portions with plant mix surfacing on existing roadbed and stabilizing portions surfacing and base by mixing portland cement therewith prior to placing plant mix surfacing 30.2 mi. between Falls River Mills and 8.3 mi. east of Bieber, Shasta and Lassen Counties; placing plant mix surfacing and applying seal coat 3 mi. between 6.5 mi. and 9.5 mi. north of Goshen, Tulare Co. G. T. McCoy, Sacramento, state hy. engr.

Bids Asked May 3

California—State Div. Hys., Sacramento, imported base material and road mix surfacing 13.4 mi. between Route 26 north of Calexico and Calipatria, Imperial Co. T. G. McCoy, state hy. engr.

Bids Asked May 18

Tex., Houston—City, c/o M. H. Westerman, secy., City Hall, repaving Main St. from McKinney to Eagle Sts. $154,000.

Bids Asked

Texas—State Hy. Comn., Austin, imprv. 25.072 mi. Wood, Cherokee, Anderson and Rusk Counties; 8.892 mi. Collin Co. Bids 3/28 rejected. CD 4/3—ENR 4/5, under LB.

Tex., San Antonio—Hill Country Estates, Inc., 402 Frost Bank Bldg., soon lets contract, 4 mi. flexible base road, over $25,000.

Sask., Tugaske—E. A. Atkinson, clk. Huron Rural Municipality, Tugaske, 19 mi. blade grading, 8 mi. elevator grading, 3 mi. gravelling.

LOW BIDDERS

California—State Div. Hys., Sacramento, Apr. 11, imprv. 60 mi. Lassen and Modoc Counties, from A. A. Tieslau, 1200 Eastshore Hy., Berkeley, **$126,126**; 4.8 mi. Madera Co., from W. C. Railing, 27 Lowell St., Redwood City, **$42,698**. CD 3/26—ENR 3/29.

Md., Baltimore—City, Bd. Awards, City Hall, Apr. 5, concrete paving alleys, Contr. 165, from Arundel Constr. Co., 910 Trinity St. **$39,070**. CD 3/27—ENR 3/29.

Michigan—State Hy. Dpt., Lansing, Mar. 22, bituminous concrete resurfacing course 4 mi. between Lake Lansing Rd. and Williamston, SM-33-37C-3 on U. S. 16, Ingraham Co., from Wright Constr. Co., Williamston, **$70,087**; 7.588 mi. SM-46-13C-20 on U. S. 223 N.W. of Rome Center, Lenawee Co., from Ann Arbor Constr. Co., 221 Felch St., Ann Arbor, **$106,380**.

Mich., Detroit—Comrs. Wayne Co., 3800 Barlum Tower, Apr. 3, imprv. approx. 2 mf. hy., from Thos. E. Currie Co., 2531 Conner Ave., **$42,348**; approx. 2.5 mi. hy., from Denton Const. Co., 4-255 Gen. Motors Bldg., **$34,681**. CD 3/26—ENR 3/29.

Okla., Oklahoma City—City, E. Simon, clk., City Hall, grading, concrete paving, etc. 16 residence blocks of 12 streets, from Earl W. Baker & Co., Bethany, **$104,772**. Est. $110,000. R. Lee, Jr., City Hall, engr.

Pa., Homestead—City, Apr. 9, 550 ft. macadam and 2 in. bituminous surfacing, retaining walls Pumping Station Rd., from Sanctis Constr. Co., 410 Marlow St., Pittsburgh, Zone 20, **$38,398**. J. M. Rice, Century Bldg., Pittsburgh, Zone 22, consult. engr.

Wis., Neenah—City, R. V. Hauser, clk., City Hall, Apr. 2, grading, paving Chestnut, Division, Spruce, Adams and Hazel Sts., Higgins, Tiggins and Doty Aves., from Chas. Green, Appleton, **$54,411**.

West Virginia—State Rd. Comn., Charleston, Apr. 10, imprv. 1.467 mi. Kanawha Co., from Ralph Meyers Constr. Co., Salem, Ind., **$387,144**. CD 3/29—ENR 4/5.

CONTRACTS AWARDED

Conn., New Britain—City, Dpt. P. Wks., City Hall, patching, repairing various streets, relaying flag sidewalks, resurfacing Arch St., to Angelo Tomasso, Inc., 101 Stanley St. Est. **$49,620**. CD 4/10—ENR 4/12.

Ia., Cherokee—Cherokee Co., Cherokee, maintenance graveling on various secondary roads to Hartsell & Evans, Early, **$39,760**. Bids 4/9. CD 4/2.

Ia., Northwood—Bd. Supvers. Worth Co., Northwood, grading 24 mi. secondary roads, to Boyette Constr. Co., Kensett, Ia., **$39,300**. Awarded 4/2. C. Capper, Northwood, co. engr.

R. I., Bristol—Town, Highway Dpt., Town Hall, highway maintenance, town labor. **$26,000**.

Pa., Phila.—City, Dpt. P. Wks. J. H. Neeson, dir., City Hall **Annex**, asphalt paving, to Union Paving Co., Broad and Stiles Sts., **$43,818**. Awarded 4/6.

Tex., San Antonio—City, asphalt repaving Hildebrand Ave. and Simpson St., to Kelly Construction Co., 2215 Belknap St., approx. **$50,000**. T. Coghill, City Hall, engr.

Que., Drummondville—Municipality paving to Modern Paving Co., Warwick. $45,000.

Que., Rouyn—Municipality, paving streets, day labor. **$36,000** voted. W. Bouchard, Town Hall, engr.

Que., Val d'Or—Municipality, sidewalk construction, reconstruction Rouyn Rd., paving Central Ave. and parts west of Rouyn Rd. and Sullivan St., Station St., day labor. **$70,000**. E. A. Ouimet, Val d'Or, engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

Illinois—State Div. Waterways, 201 W. Monroe St., Springfield, channel clearing and rectification Hickory Creek, improved flood discharge capacity, disposition sewage emptying into Hickory Creek and its tributaries, in Joliet, etc. $305,000. T. B. Casey, 201 W. Monroe St., Springfield, ch. engr.

Ill., Fox Lake—State Div. Waterways, 201 W. Monroe St., Springfield, dredging navigation channels, Fox Chain-of-Lakes, Route 18, across southern end of Grass Lake to lower end of Crab Apple Island, 48,000 cu. yd., near here. Over $15,000. T. B. Casey, 201 W. Monroe St., Springfield, ch. engr.

Ill., Mound City—City, City Hall, providing same protection in back of city as in front, involving raising back levee approx. 3 ft. for 1.7 mi. Approx. $50,000. T. B. Casey, ch. engr. Illinois Div. Waterways, 201 W. Monroe St., Springfield, engr.

Tex., Athens—Henderson Co. Levee Dist. 3, Athens, restoring dam at Old Lake and Upper Lake. $50,000.

Tex., Trinidad—Henderson Co. Levee Dist. 3, Athens, levee work. $100,000.

BIDS ASKED

Bids Asked April 17

Massachusetts—Dpt. P. Wks., Commonwealth of Massachusetts, 100 Nashua St. Boston, repairing sea wall, Annisquam Canal, reconstructing section about 60 ft. long on westerly side of entrance, Gloucester Harbor; placing stone riprap paving, filling and grading, on left bank of Herring River, Harwich. $15,000. Plans deposit $2.

Bids Asked April 24

N. S., Parrsboro Beach—Secy. Dpt. P. Wks., Ottawa, Ont., breakwater repairs. $65,000. Plans deposit $20. CD 3/26—ENR 4/5.

Bids Asked April 25

Pa., Phila.—City, Dpt. P. Wks., City Hall Annex, dredging Schuylkill River, at selected location.

Bids Asked April 26

Ia., Nevada — Bd. Supervs. Story Co. Nevada, constructing Palestine Drainage Dist. 115, involving 16,870 lin. ft. drain tile from 6- to 20-in. size, 80 lin. ft. corrugated metal culvert pipe and four 18 in. intakes. Over $15,000. S. Steigerwait, Nevada, co. engr.

Bids Asked April 26

Wis., Fond du Lac—Fond du Lac County Farm Drainage Bd., Hutter Bldg., 28,362 cu. yd. each, channel excav. and leveling spoil bank., 13,020 ft. 6 to 10-in. tile for drainage in town of Rosendale. Plans deposit $. C. C. Travis, 627 Natl. Exchange Bldg., engr.

LOW BIDDERS

†**N. J., Fort Dix (br. Trenton)**—U. S. Eng., 20 Wall St., New York 5, N. Y., Apr. 12, correcting drainage deficiency, from Seaboard Constr. Co., 1528 Walnut St., Phila., Pa. **$148,072**.

Bids Asked May 1

Calif., Glendale—Los Angeles Co. Flood Control Dist., 751 S. Figueroa St., Los Angeles, Zone 14, School Debris Basin for flood protection. $15,000. H. E. Hedger, 751 S. Figueroa St., Los Angeles, engr. CD 11/15—ENR 11/23/44.

†**Md., Perry Point**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., dredging 13,500 cu. yd. intake channel, Proj. 2489.

CONTRACTS AWARDED

†**N. Y., Brooklyn**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging Pier 36, NOY 11924, to Morris Cummings Dredging Co., Inc., 44 Whitehall St., **New York**, Zone 4. **$18,600**.

†**N. Y., Brooklyn**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., maintenance dredging Berth 20, Navy Yard, NOY 12099, to Morris & Cummings Dredging Co., Inc., 44 Whitehall St., New York, Zone 4, **$54,500**.

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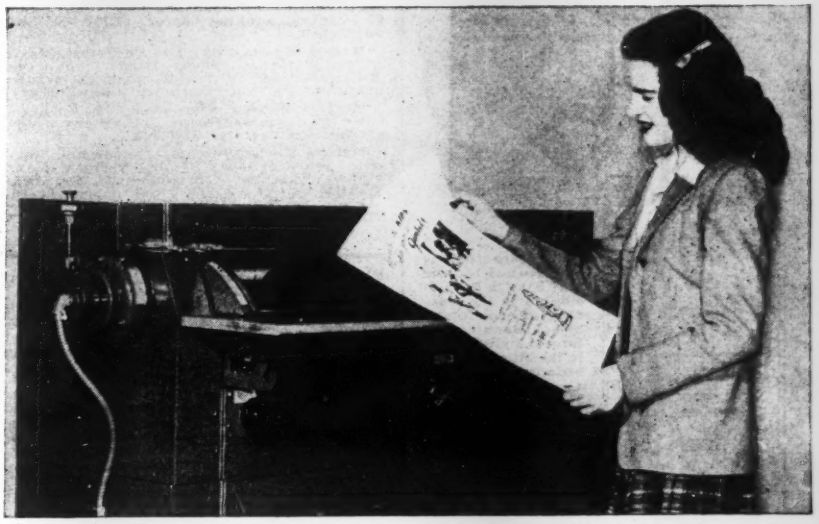

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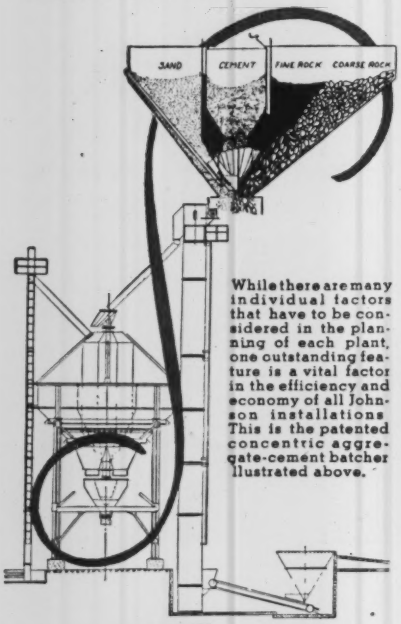

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EARTHWORKS, WATERWAYS (Cont'd.)

†Okla., Altus—Bureau Reclamation, Altus, earthwork and rip rap for dikes and railway embankment, Spec. 1084, to Morrison-Knudsen Constr. Co., 319 Bway., Boise, Idaho, $154,280. Awarded 4/5.

B. C., Westview—National Harbours Bd., harbour imprvs., to Northern Constr. Co., and J. W. Stewart, Ltd., 739 Granville St., Vancouver, $197,777. CD 3/26—ENR 4/5.

LATIN AMERICA

Bahamas, Nassau—Gov't. of Bahamas, Nassau, plans addnl. attraction for tourists, beautification of public parks, gardens, etc. $100,000.

British Honduras, Belize—Government of British Honduras, Belize, plans replacing bridge over Roaring Creek. $75,000. Dpt. P. Wks., Belize, engr.

Colombia, Barbosa—Government of Colombia, Bogota, will reconstruct roads, by day labor. 400,000 pesos voted. Ministry of Public Works, Bogota, engr.

Colombia, Bucaramanga—Republic of Colombia, Bogota, will reconstruct roads, by day labor. 560,000 pesos voted. Ministry of Public Works, Bogota, engr.

Colombia, Ibague—Republic of Colombia, Bogota, will reconstruct road by day labor. 476,000 pesos voted. Ministry of Public Works, Bogota, engrs.

Mexico—Colima State Government, Lic. Manuel Gudino, governor, Palacio del Estado, Colima, plans completing road to Manzanilla and Culiacan. $2,885,000.

Mexico—Dpt. P. Wks., President Avila Camacho, Tacuba St., will imprv. Pan-American Highway, by day labor. $8,000,000.

Mexico, Atzcapotzalco—Petroleos Mexicanos, Efrain Benrostro, mgr., Mexico City, will imprv. main oil refinery, by day labor. $18,000,000 with equip.

Mexico, Lerma—Municipl Govt., Palacio Municipal, Lerma, plans 2 story school. $200,000.

Mexico, Mexico City—Federal District, Javier Rojo Gomez, mayor, Municipal Bldg., will construct addns., and repair street car lines by day labor. $300,000.

Mexico, Mexico City—Banco Internacional, S.A., Edif. Guardiola, Mexico, D.F., plans 12-14 story, banking center. $1,150,000. Site purchased.

Mexico, Mexico City—Lee De Forest, Mexico City, Mexico, and S. Vermont St., Los Angeles, Calif., U. S. A., plans television plant, station and laboratory bldg. $300,000.

Mexico, Mexico City—Miel de Yucatan, S.A., Coahuila, 6, Mexico, D.F., plans honey preparation factory. $100,000.

Mexico, Torreon—State of Coahuila, Governor Benecio Lopez Padilla, Torreon, plans highway between Torreon and Monclova. $100,000.

PUBLIC BUILDINGS

PROPOSED WORK

†Ariz., Tucson—Pub. Housing Auth., NHA, 760 Market St., San Francisco, Calif., 25 family stop-gap dwelling units, Ariz. 2380.

†Calif., Benecia — Pub. Housing Auth., NHA., 760 Market St., San Francisco, plans by J. J. Donovan, 950 Parker St., Berkeley, 150 temporary family dwelling units, Calif. 4984.

Calif., Concord—Concord School Dist., Concord, bond election Apr. 27, alterations, addns. to school bldgs. $195,000. Dragon & Schmidts, 2068 Allston Way, Berkeley, archts. CD 3/19—ENR 3/22.

†Calif., San Clemente—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 15 family stopgaps, Calif. 4075.

†Conn., Norwalk—Norwalk Tire & Rubber Co., Winnepauk, Norwalk, plans by Fletcher Thompson, Inc., engr. and archt., 211 State St., Bridgeport, 2 story, 50x100 ft., brick, steel boiler plant and administration unit addns., alterations, incl. Bigelow Boiler. Over $40,000. Defense Plant Corp. will finance.

★**†Conn., West Haven (br. New Haven)**—Armstrong Rubber Co., 475 Elm St., New Haven, bids soon mfg. bldg. addn. $1,000,000. Defense Plant Corp. will finance. Fletcher Thompson, Inc., 211 State St., Bridgeport, engr. CD 2/27—ENR 3/1.

†Fla., Miami—City, City Hall, 2 addnl. stories to Jackson Memorial Hospital for care of disabled merchant seamen, $117,150. FWA.

★**†Ill., Rockford**—W. F. and John Barnes Co., Rockford, addnl. plant bldg. Approx. $6,500,000. Defense Plant Corp. will finance.

★**†Md., Bethesda**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., making plans 2 story, bsmnt., brick, concrete laboratory, $700,000.

†Pa., Phila.—Federal Works Agency, 1800 F St. N.W., Wash. 25, D. C., revising plans office bldg. alterations, $14,800.

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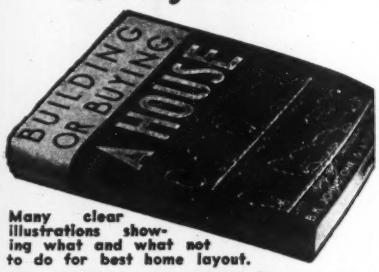

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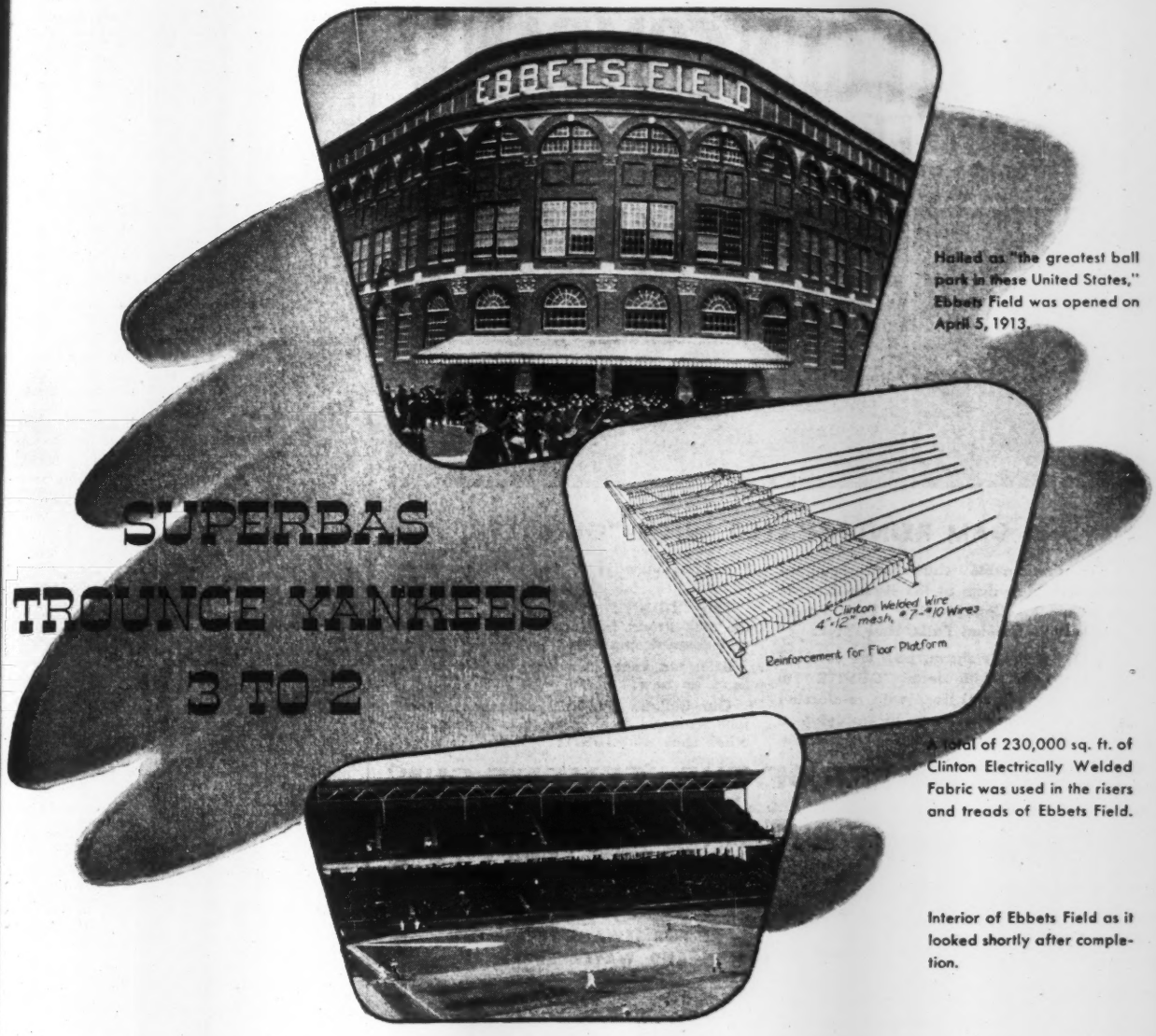

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*Brooklyn Daily Eagle; April 6, 1913

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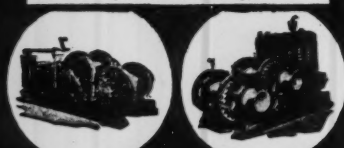

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

†**Pa., Aspinwall (br. Pittsburgh)**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., sketches completed altering 4 story, bsmnt., brick, concrete infirmary, incl. spinal paralysis treatment ward, dental clinic, physical therapy treatment ward, elevator, $250,000.

★†**Pa., Washington**—National Supply Co. Grant Bldg., Pittsburgh, soon lets contract forge plant rehabilitation, alterations for War Dpt. $1,800,000, incl. equip. CD 3/14—ENR 3/22.

†**Pa., York**—Blaw-Knox Co., R.D. 5, York, making plans, ordnance plant alterations, addn., for Navy Dpt. $360,000. E. P. Simon, 123 S. Broad St., Phila., archt.

†**S. C., Beaufort**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., architectural and engineering services by Paul P. Cret & N. J. Pease & Co., Inc., 1518 Walnut St., Phila., Pa., for hospital bldg.

★†**Tex., Baytown**—U. S. Eng., 25 St. and Ave. F, Galveston, addnl. bldg. at Baytown Ordnance plant. $500,000.

Tex., Dallas—Dallas Co., Courthouse, plans by Geo. L. Dahl, Southland Life Annex Bldg., storage bldg. $40,000.

★†**Tex., Fort Sam Houston**—U. S. Eng., Fort Sam Houston, addnl. expan. Brooke General Hospital, $1,486,222.

Tex., Galena Park—W. Hinds, supt. Schools, Galena Park, plans by Hedrick & Lindsley, So. Standard Bldg., Houston, high school and addn. school. $199,895. Applied for FWA funds. CD 7/7—ENR 7/13.

Tex., Port Arthur—City, City Hall, voted bonds fire station. $150,000. N. Stewart Adams Bldg., archt. CD 3/13—ENR 3/15.

Wash., Longview—Port of Longview, Longview, grain elevator addn. $225,000.

Wash., White Salmon—School Dist. (no) White Salmon, plans by Naramore & Brady, Dexter Horton Bldg., Seattle, and Lawrence & Lawrence, Failing Bldg., Portland, Ore., and bids in Summer, 2 story, school at Trout Lake, near here. $150,000.

†**Alaska, Anchorage**—Pub. Housing Auth., NHA, Skinner Bldg., Fifth Ave., Union St., Seattle 1, Wash., plans by Naramore, Bain, Brady & Johanson, Smith Tower, 2 and Yesler Sts., Seattle 4, Wash., 40 family housing units and conversion of dormitory making 18 addnl. units, Proj. 50084. $174,000. CD 4/3—ENR 4/5.

†**Alaska, Fairbanks**—Pub. Housing Auth., NHA, Skinner Bldg., Fifth Ave., Union St., Seattle 1, Wash., plans by Naramore, Bain, Brady and Johanson, Smith Tower, Seattle 4, Wash., 40 housing units in 2 story frame bldgs., with central steam heating plant, at Ladd Field, Alaska 50077 and 50082. $150,000. CD 4/3—ENR 4/5.

†**Alaska, Juneau**—Pub. Housing Auth., NHA, Skinner Bldg., 5 and Union Sts., Seattle 1, Wash., plans by H. D. Foss, P.O. Box 2623, 30 family dwelling units, Proj. 50083. $90,000. CD 4/3—ENR 4/5.

★**B. C., Vancouver**—Dpt. P. Wks., Victoria, plans by H. Whittaker, c/o owner, bldgs. for University of British Columbia. $5,000,000.

★**Sask., Regina**—Provincial Govt., c/o Ministry of P. Health, Regina, 5 story wing cancer clinic and laboratory. $800,000.

BIDS ASKED

Bids Asked April 23

N. S., Halifax—H. F. Bezanson, 81 Sackville St., auditorium and gymnasium. Robie St. Plans deposit $50. C. A. Fowler & Co., Capitol Bldg., archts.

Bids Asked April 24

★†**Conn., West Haven (br. New Haven)**—Armstrong Rubber Co., 475 Elm St., 6 story, sub-bsmnt., and 6 story, 180x240 ft. rein.-con. factory, Elm St. $2,000,000. Defense Plant Corp will finance. Fletcher Thompson, Inc., 211 State St., Bridgeport, engr. CD 4/12—ENR 4/19.

Bids Asked April 24

Mich., East Lansing—Secretary Michigan State College, East Lansing, 4 apartments for married students. $300,000. Plans deposit $50. O. J. Munson, 409 Wilson Bldg., Lansing, archt.

Bids Asked April 24

N. S., Shelburne—Secretary Dpt. Munitions & Supply, Ottawa, Ont., armament depot exten., and altering Bldg. 47, at Naval Base. About $50,000.

Bids Asked About April 25

†**Ga., Jefferson**—City, A. W. Ash, supt. Educ., Jefferson, 22 classroom school, Ga. 9-340. $218,000. **FWA**, F. M. Daves & Assoc., 774 Spring St. N.W., Atlanta, archts. CD 3/15—ENR 3/22.

Bids Asked April 26

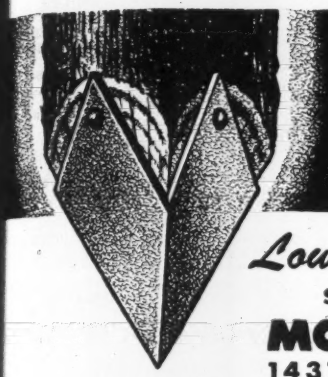
★†**Ala., Montgomery**—Housing Auth., City of Montgomery, 528 Bell St., low rent housing, Ala. 6-5, for NHA.

Bids Asked April 26

†**Wash., Pasco**—Pub. Housing Auth., NHA Skinner Bldg., 5 and Union Sts., Seattle Zone 1, 115 temporary family dwelling units Wash., 54318-N. $285,000. J. W. Maloney, Larson Bldg., Yakima, archt. CD 3/30—ENR 4/5.

Bids Asked April 27

†**Ga., Blakely**—Bd. Trustees Blakely Union, Municipal Auditorium, City Hall, Blakely, elementary and senior high school, Ga. 9-343(n). **FWA**, H. L. Holman, Jr., Holman Bldg., Ozark, Ala., archt. CD 3/16—ENR 3/22.



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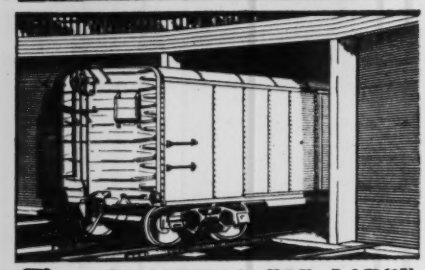

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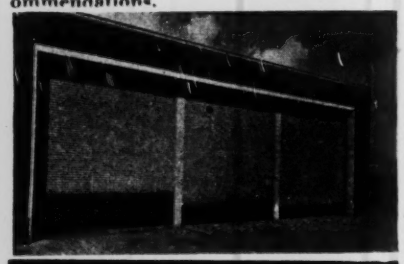

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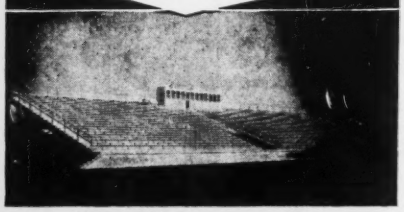

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PUBLIC BLDGS. (Bids Asked, Cont'd.)

Wash., Longview—J. F. McCarthy, atty. for Port of Longview, National Bank Bldg., excav. and piling for grain elevator addns. Plans deposit $25.

N. J., South Orange—Bd. Educ., School Dist. of South Orange and Maplewood, 27 Berkshire Rd., Maplewood, extn. high school. Plans deposit $15. C. E. Kuhlmer, 6 Yale St., archt.

Bids Asked April 30

†**Ind., Indianapolis**—Dpt. P. Health & Charities, 1140 E. Market St., health clinic, Ind. 12-224-N. **FWA.** Plans deposit $25. H. R. Robinson, 1927 11 St. N. W., Wash., D. C., archt. CD 11/6—ENR 11/9.

Bids Asked May 1

†**Ga., Columbus**—Housing Auth. of City of Columbus, central office bldg. group, Ga. 4-5 for NA. Extended date. CD 4/3—ENR 4/5.

Bids Asked May 1

Wash., Longview—J. F. McCarthy, atty. for Port of Longview, National Bank Bldg., grain elevator addn., with 20 storage bins, $200,000. Plans deposit $150. CD 4/11—ENR 4/19.

Bids Asked May 8

†**Mich., Dearborn**—Veterans Admin., Vermont Ave. between H and I Sts. N.W. Wash. 25, D. C., concrete piling for Theatre Bldg. 22, Proj. No. 2413-A.

Bids Asked May 9

Ind., Franklin—Bd. Comrs. Johnson Co., L. A. Young, aud., Court House, 2 story, basmt., brick, stone, rein.-con. hospital. $200,000. Plans deposit $25. McGuire & Shook, 1400-01 Fletcher Trust Bldg., Indianapolis, archts. Jno. M. Rotz Engrg. Co., 804 Merchants Bank Bldg., Indianapolis, mechanical engr. CD 11/30—ENR 12/7.

Bids Asked May 22

†**Colo., Fort Lyon**—Veterans Admin., Vermont Ave. between H and I Sts. N.W. Wash. 25, D. C., 2 tile silos, 20 ft. diam., and 40 ft. high.

LOW BIDDERS

†**Calif., Long Beach**—Long Beach Bd. Educ., 715 Locust Ave., Apr. 7, 4 bldgs., at Stephens Jr. High School, Columbia St. at Santa Fe Ave., Calif. 4-621-N, Unit 9, from Modern Builders Constr. Co., 2812 American Ave., **$397,281. FWA.** K. S. Wing, 501 Termino Ave., archt.

★ †**Calif., San Diego**—Pub. Housing Auth., NHA, 816 W. 5 St., Los Angeles. Apr. 7, 400 war dwelling units, **Calif. 4995-N**, from A. F. Blair, 7052 Santa Monica Blvd., Los Angeles, **$897,890.** CD 3/27—ENR 3/29.

La., Monroe—City, City Hall, P. A. Goag, city treas. City Hall, Apr. 11, Contr. 12, power piping, for power plant imprvs., from Midwest Piping & Supply Co., Inc., 1450 S. 2 St., St. Louis, Mo., **$190,480.** CD 3/26—ENR 3/22.

†**Tex., Fort Sam Houston**—U. S. Eng., Fort Sam Houston, physical therapy center for Brooke Convalescent Hospital, Ser. No. W-41-154-45-97, from Hill & Combs, 321 Melrose Pl., San Antonio, **$134,711.**

★ †**Wash., Bangor**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W. Wash. 25, D. C., Apr. 5, 70 addnl. ammunition magazines with rail and highway facilities, addnl. safety and fire equip., at Naval Magazine, Spec. 16223, NOY 11956-353, from Sound Kiewit Constr. Co., 1403 W 45 St., Seattle, Zone 7, **$2,684,105.** CD 3/9.

†**Wis., Carrollville**—Reconstruction Finance Corp., 208 S. LaSalle St., Chicago, Ill., Apr. 11, two 1 story, 176x580 ft., steel frame, concrete block storage warehouses, from Siess Constr. Co., 514 E. Ogden Ave., Milwaukee, Zone 2, **$197,000.** K. Franzheim & A. B. Mills, 728, 17 St. N.W., Wash., D. C., archts.

†**Wis., Wausau**—Marathon Foundry & Machine Co., 1212 West St., 2 story, 55x60 ft. concrete block core room bldg., concrete fdn., from C. J. Lang, 203 Bway. Est. **$40,000.** Defense Plant Corp. will finance. Openhamer & Obel, Wausau, archts.

CONTRACTS AWARDED

†**Calif., Oceanside**—Pub. Housing Auth., NHA, 816 W. 5 St., Architects Bldg., Los Angeles, 200 family war dwellings, Calif. 4994-N, to Shumaker & Evans & P. W. Womack, 4007 W. 6 St., Los Angeles, **$462,248.** Bids 4/7, awarded 4/9. CD 3/27—ENR 3/29.

†**Calif., Seal Beach**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W. Wash. 25, D. C., mark 8 test and vacuum cleaning bldg., N. A. & N. D., NOY 11910, to W. C. Smith, Inc., 717 Title Guaranty Bldg., Los Angeles, Zone 13, **$81,800.** CD 3/23.

†**Fla., Daytona Beach**—U. S. Eng., Post Office Bldg., Savannah, Ga., addnl. bldgs. at Welch Convalescent Center, to Paul A. Miller Constr. Co., Leesburg, **$211,578.** CD 4/3—ENR 4/5.

★ †**Ind., Camp Atterbury**—U. S. Eng., 6th Federal Bldg., Louisville, Ky., converting barrack bldgs. into wards for convalescent hospital facilities at Wakeman General Hospital, to Dunlap & Co., Inc., and Shelby Constr. Co., Inc., Columbus, **$785,324.** CD 3/19—ENR 3/22.

†**Mo., Sikeston**—Reconstruction Finance Corp., 407 N. 8 St., St. Louis, Zone 1, two 1 story, 126x400 ft., brick, steel concrete warehouses at Harvey Park Airport, to Gamble Constr. Co., 620 Chestnut St., St. Louis, Zone 1, **$110,900.** Bids 4/4. K. Franzheim-A. B. Mills, 728 18 St. N.W., Wash., D. C., assoc. archts.

PUBLIC BUILDINGS. (Contracts Awarded, Cont'd.)

†**Va., Quantico**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., commissary addn., Marine Barracks, NOY $250, to Eugene Simpson & Bro., West Walnut St., Alexandria, **$178,890.**

†**W. Va., Point Pleasant**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., covered storage warehouse, N. M. R. C., NOY 11623, to Frank Messer & Sons, Inc., 2515 Burnet Ave., Cincinnati, O., **$292,200.** CD 4/3, under LB.

Ont., Wingham—Hospital Bd., R. H. Lloyd, chn., Wingham, 3 story, bsmnt., 50x60 ft., brick, rein.-con., hospital alterations, to Putherbough Constr. Co., 320 Colborne St., London. Est. **$150,000.** L. G. Bridgeman, Royal Bank Bldg., London, archt. Awarded 4/5.

★**Que., Cartierville**—Rev. Sisters of Charity of Providence, 3300 Blvd. Gouin West, Sacred Heart Hospital addns., Blvd. Gouin West, to Concrete Constr. Co., Ltd., 1082 Decarie Blvd., Montreal, about **$550,000.** G. Gagnier, 308 St. Catherine St. E., Montreal, archt. J. A. Kearns, 1414 Drummond St., Montreal, engr.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., San Jose—San Jose Chapter 11, Disabled American War Veterans, 325 N. 3 St., DAV center, incl. business offices, large auditorium with clubrooms, women's lounge and bsmnt. dining room. $200,000.

★**Pa., Coatesville** — Langoma Industries, Inc., Coatesville, 400 brick, frame residences. $1,500,000.

Pa., Franklin—V. A. Rigamount, archt. 5471 Coral St., Pittsburgh, soon lets general contract 2 story, bsmnt., 60x300 300x60x40 ft., terra cotta, brick theatre, for Kayton Entertainment Co., L. T. Houghton, Franklin, Pa. and P. McKay, Montgomery, W. Va., Co-owners. $150,000. CD 12/28—ENR 1/4.

Pa., Lemoyne—Trinity Lutheran Church, Rev. E. Snivel Frey, pastor, 517 Hammel Ave., soon lets contract church and Sunday School. $150,000. Wenner & Fink, 1701 Arch St., Phila., archts. CD 8/1—ENR 8/3.

Pa., Muncy—Muncy Valley Hospital, c/o J. A. Covert, Muncy, plans by M. I. Kast, 222 Market St., Harrisburg, 3 story, brick, steel hospital. $250,000.

★**Tex., Houston**—Memorial Hospital, R. Jolley, dir., 602 Lamar Ave., plans completed by K. Franzheim, 2306 Crawford St., 5 story, 100x225 ft. rein.-con. nurses home and school, concrete slab fdn., Smith St. between Lamar and McKinney Aves. $1,000,000. CD 3/7—ENR 3/22, under Postwar Projects.

Tex., Houston—Pine Forrest Country Club, H. B. Bettell, chn. Organization Com., 721 W. 39 St., plans by J. Bredemus, 721 W. 39 St., country club, incl. clubhouse, tennis courts, 18 hole golf course, property shop, tennis shop, kitchen and locker rooms. N. Shepherd Dr. and W. 34 St. $250,000.

★**Sask., Regina**—English Odeon Theatres of Canada, Ltd., 2 King St. E. Toronto, Ont., plans by J. I. English, 2 King St. W. Toronto, theatre, 1900 Black Scarth St. About $500,000. CD 4/9.

BIDS ASKED

Bids Asked April 24

N. C., Asheboro—Randolph Hospital, Inc., D. B. McCrary, chn. Bd., Asheboro, hospital and nurse's home addn. Plans deposit $30, general construction, $25, for plumbing and heating. E. G. Flannagan, Henderson, archt. CD 4/5—ENR 4/5.

Bids Asked April 27

Tex., Houston — Hedrick & Lindsley, archts., 811 S. Standard Bldg., 3 story, bsmnt., rein.-con., brick, hollow tile hospital, boiler house and laundry plant, for Sisters of Immaculate Conception, c/o St. Elizabeth's Hospital, Elizabeth St. CD 4/10—ENR 4/12.

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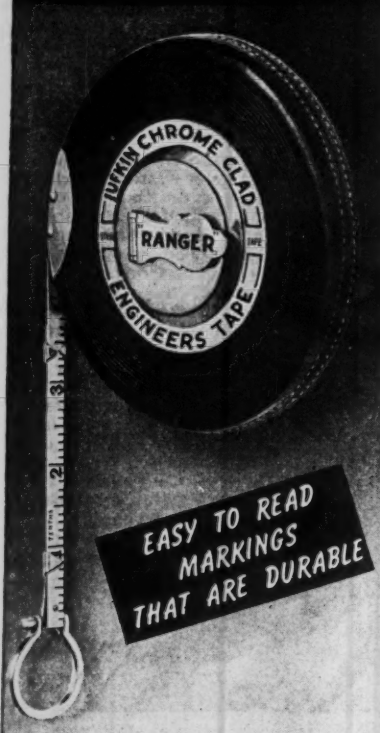

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COMMERCIAL BLDGS. (Cont'd.)

CONTRACTS AWARDED

Colo., Colorado Springs—Glockener Sanatorium & Hospital, 2200 N. Tejon St. (Sisters of Charity) 2 story, bsmnt., brick, stone hospital addn. to Platt Rogers, Inc., Box 153, Pueblo. Est. **$166,000.** CD 4/9—ENR 4/12.

★ **Ont., Toronto** — Carlton Hotel, Ltd., Yonge & College Sts., 12 story hotel, to C. W. James Constr. Co., Ltd., 613 Spadina Ave. Est. **$3,250,000.** F. Frame, 613 Spadina Ave., engr.

★ **Que., Quebec City**—E. Chalifour, 94 de la Couronne St., 65 dwellings, Montcalm St. Owner builds. **$520,000.** CD 4/12.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Alameda—PLANT BLDG., etc.—United Engineering Co., Ltd., foot of Main St., plans by J. Hudspeth, 2104 Addison St., Berkeley, boiler installation and steel, precast concrete masonry bldg. for boiler, $60,000.

Calif., Modesto—PLANT—Floden Bros., 1325 9 St., plans by G. N. Hilburn, 1211 K St., turkey packing plant. $50,000.

Calif., Richmond—PLANT BLDGS.—H. J. Kaiser Co., Latham Square Bldg., Oakland, soon lets contract in-plant feeding service, consisting enlargement cafeteria and constructing 2 food dispensaries throughout yard. $250,000.

Calif., St. Helena—PLANT—Silverado Co-operative Dryer, P. Molinari, pres., St. Helena, fruit dryer plant. **$94,000.**

Calif., Sebastopol—PLANT—Pleasant Hill Cooperative Assn., Kennedy Rd., 6 kiln dehydrator bldg. $70,000.

Conn., Hamden — PLANT — Connecticut Metal & Finishing Co., Haig St., plans completed 1 story, mezzanine, 100x150 ft., brick, steel plant, Haig St. $75,000. Westcott & Mapes, Inc., 139 Orange St., New Haven, engrs.

Conn., New London—GARAGE—Cushman Burke Motors, Inc., Broad St., revised plans by F. S. Langdon, 325 State St., 1 story, 57x124 ft., and 26x100 ft., brick, concrete, cinder block sales and service garage, Broad St. $45,000. CD 12/12—ENR 12/14.

Conn., New London—GARAGE—Owner, c/o F. S. Langdon, archt., 325 State St., making plans 1 story, 60x200 ft., brick, steel, cinder block service garage, $40,000.

Conn., Stamford—SHOPS—Atlas Powder Co., Delaware Trust Bldg., Wilmington, Del., soon lets contract, brick shops, 269 Ludlow St. Over $40,000. J. W. Hanson, Delaware Trust Bldg., Wilmington, Del., engr.

Fla., Belle Glade—PLANT—Florida Ramie Products Corp., Belle Glade, bids soon plant, $250,000. Johns-Manville Co., 22 E. 40 St., New York, N. Y., engrs.

Ill., Glenarm—COMPRESSOR STATION UNIT—Panhandle Eastern Pipeline Corp., 99 and Holmes Sts., Kansas City, Mo., one 1,000 hp. unit at compressor station. $325,000.

★ **Ill., Pleasant Hill**—COMPRESSOR STATION UNITS—Panhandle Eastern Pipeline Corp., 99 and Holmes Sts., Kansas City, Mo., four 800 hp. units, at compressor stations, $525,000.

★ **Kan., Greensburg**—COMPRESSOR STATION UNITS—Panhandle Eastern Pipeline Co., 99 and Holmes St., Kansas City, Mo., four 1,300 hp. units at compressor station, $950,000.

★ **Kan., Haven**—COMPRESSOR STATION UNITS—Panhandle Eastern Pipeline Co., 99 and Holmes Sts., Kansas City, Mo., three 1,300 hp. units at compressor station, $700,000.

Kan., Hugoton—COMPRESSOR STATION —Panhandle Eastern Pipeline Co., 99 and Holmes Sts., Kansas City, Mo., 2,400 hp. compressor station at Hugoton Gas Field, $435,000.

★ **Kan., Louisburg**—COMPRESSOR STATION UNITS—Panhandle Eastern Pipeline Corp., 99 and Holmes Sts., Kansas City, Mo., five 1,000 hp. units at compressor station, $1,135,000.

★ **Kan., Olpe**—COMPRESSOR STATION UNITS—Panhandle Eastern Pipeline Corp., 99 and Holmes Sts., Kansas City, Mo., five 800 hp. units at compressor station, $700,000.

Md., Baltimore—STORAGE, etc.—Baltimore & Ohio R.R. Sys., A. C. Clarke, ch. engr., Baltimore and Charles Sts., soon lets contract 1 story, brick, steel, concrete gear storage bldg. addn., gear storage bldg. $40,000

Minn., Mankato—PLANT—A. R. Kleinschmidt & Son, Mankato, carp canning plant, $100,000.

★ **Mo., Centralia**—COMPRESSOR STATION UNITS—Panhandle Eastern Pipeline Co., 99 and Holmes Sts., Kansas City, Mo., four 800 hp. units at compressor station, $525,000.

★ **Mo., Houstonia**—COMPRESSOR STATION UNITS—Panhandle Eastern Pipeline Corp., 99 and Holmes Sts., Kansas City, Mo., four 1,300 hp. units at compressor station, $940,000.

Mo., St. Louis—WAREHOUSE—Gilbert Martin Co., 1322 Dolman St., Zone 4, making plans, altering, imprv. 1 story, 142x457 ft., and 142x364 ft. factory into offices for mfg., etc. surgical supplies and equip., 1901 Missouri Ave. B. Shapiro, 705 Chestnut St., archt. $75,000.

N. J., Pemberton—PLANT—Pemberton Lumber & Millwork Corp., Pemberton or John A. Johnson Constr. Co., 268 41 St., Brooklyn, N. Y., rebuilding lumber and millwork plant, $150,000.

N. C., Marshall—POWER HOUSE SWITCH BOARD—French Broad Electric Membership Corp., Marshall, soon lets contract, General Electric Company manual switchboard in power house, Proj. NC-2046 G1 Madison, J. B. McCrary Engr. Corp, 1408-22 Marietta St. Bldg., Atlanta 3, Ga., engr. CD 3/14—ENR 3/16.

Ore., Salem—PLANT—Oregon Flax Textiles, Inc., W. H. Bonesteel, mgr., 3060 Portland Rd., 92 x 200 ft., rein.-con. textile plant. $40,000.

Pa., Coatesville—PLANT—Langoma Industries, Inc., Coatesville, brick, steel industrial plant, $250,000.

Pa., Eddystone—FACTORY—General Steel Castings Corp., Essington Ave., factory addn. Approx. $40,000.

Pa., Phila.—PLANT—Merchant Building Corp., c/o H. Lobe, 1420 Walnut St., repairing 4 story industrial bldg. $200,000.

Pa., Phila.—PLANT—Midvale Co., 4320 Wissahicken Ave., plans nearing completion steel billet testing bldg. $55,000.

Tex., Clyde—PUMPING UNITS—Magnolia Pipe Line Co., Magnolia Bldg., Dallas, 1 electric-powered pump. units on Midland-Corsicanna line. Each over $40,000.

Tex., Edinburg — PACKING PLANT — Donna Fruit Co., c/o A. B. Hill and J. C. Powell, 622 N. Closner St., making plans 1 and 2 story, frame, sheet metal packing plant.

Tex., Edinburg — ABATTOIR — Dwight English, 521 Sprague St., 1 story, brick, rein.-con. abattoir. $40,000.

Tex., Mertens—PUMPING UNIT—Magnolia Pipe Line Co., Magnolia Bldg., Dallas, electric-powered pump. unit on Midland-Corsicana line. Over $40,000.

Tex., Raymondville—PLANT—Delta Canning Co., 530 E. Harris St., 1 story, 80x125 ft., and 1 section to be 2 story, 40x80 ft. processing plant. $40,000.

Tex., Walnut Springs—PUMPING UNITS—Magnolia Pipe Line Co., Magnolia Bldg., Dallas, 2 electric-powered pump. units on Midland-Corsicana line, each Over $40,000.

Tex., Weslaco—WAREHOUSE—Mid-Valley Bonded Warehouse, c/o Central Power & Light Co., 309 Texas St., 2 story, brick, concrete warehouse, $40,000.

Vt., Montpelier—PLANT—Montpelier Co-on. Freeze Lockers, Montpelier, soon lets contract, individual lockers, quick freeze storage plant, Barre St. Extended date. P. R. Webber, Glove St., Rutland, archt. H. Bond, Albany, engr. CD 4/3—ENR 4/5.

Wyo., Rock Springs—GARAGES, etc.—Union Pacific Coal Co., Rock Springs, soon lets contract nine 6-stall, 1 story, 29x38 ft. tile garages; 1 story, bsmnt., 32x96 ft., steel I-beam brick store bldg. and community house, fifty 28x32 ft., frame houses, in Stansbury, outside of here.

Ont., Barrie—FACTORY—Canadian General Electric Co., Ltd., 212 King St. W., Toronto, soon lets contract, 1 story, 150x300 ft., electrical appliance factory and 2 story office bldg., 150x300 ft., brick, steel. $150,000. Beck & Eadie, 220 Bloor St., W. Toronto, archts W. J. Armstrong, 989 Bay St., Toronto, engr. CD 2/2—ENR 2/8.

Ont., Brantford—PLANT—Proctor & Redfern, Ltd., engrs., Excelsior Life Bldg., Toronto, soon let contract 1 story, 80x120 ft., brick refrigeration room, 2nd story over half structure, 4 story tower, plant exten., for S. C. Johnson & Co., Ltd., Frank St. $100,000

Ont., Toronto—PLANT—Electric Chain Co. of Canada, Ltd., 171 John St., plans by Page & Steele, 20 St. Clair Ave., W., addnl. plant accommodations, $45,000. CD 4/5.

Que., Joliette—PLANT—Meunerie Cooperative de Joliette, Joliette, processing plant. $40,000.

Sask., Saskatoon — PLANT — Kramer-Church Tractor Co., Ltd., Regina, plant. $60,000.

BIDS ASKED

Bids Asked After April 15

Tex., Weslaco—PLANT—American Fruit Growers, Inc., Weslaco, 1 and 2 story, citrus and vegetable packing plant, brick, concrete. $100,000 CD 4/4—ENR 4/12.

Bids Asked April 23

Ont., Brockville—PLANT—J. C. Day, 1503 St. Catherine St. W., Montreal, Que., 1 story, 110x125 ft., brick, concrete structural steel plant addn., with loading platform. $60,000. CD 3/14—ENR 3/29.

Bids Asked About April 26

Ore., Worden—STORAGE BINS, etc.—Tulana Farms, Malin rein.-con. grain storage bins and field house, installing grain and seed cleaners with 14 rein.-steel circular storage tanks, each 90 ft. high, 27 ft. diam., and 22 smaller tanks. $282,000. E. F. Carter, 837 W. Hastings St., Vancouver, B. C., engr.

INDUSTRIAL BLDGS. (Bids Asked, Cont'd.)

Bids Asked

La., Monroe—MEASURING STATIONS—United Gas Pipe Line Co., 1525 Fairfield Ave., Shreveport, 2 measuring stations (on 40 mi. main pipeline, Monroe area). $100,000. CD 3/21—ENR 3/29.

Pa., Carlisle—PLANT—Carlisle Tire & Rubber Co., F. Marshall, pres., 621 North College St., plant addn. $125,000.

Tex., Alamo—PLANT—A. F. Buchanan, 401 W. School St., 1 story, brick, rein.-con. dehydration plant, $45,000. CD 3/23—ENR 3/29.

Tex., Amarillo—HATCHERY—R. Atkisson, Amarillo, 1 story, 50x141 ft., brick, hollow tile hatchery bldg. $40,000. E. F. & Jas. F. Rittenberry, Fisk Bldg., archts. CD 2/8—ENR 2/15.

Tex., Brownsville—WAREHOUSE—Feld-Reynolds Warehouse Corp., 501 Middle St., Houston, warehouse. $70,000. Finger & Russell, 711 National Standard Bldg., Houston, archts. CD 3/15—ENR 3/22.

Tex., Carthage—MEASURING STATIONS—United Gas Pipe Line Co., 1525 Fairfield Ave., Shreveport, La., 2 measuring stations. $100,000. CD 3/21—ENR 3/29.

Tex., Monte Alto—CANNERY, etc.—Mid Valley Cooperative Canning Co., c/o Rio Farms, Inc., Monte Alto, vegetable cannery and processing plant, $50,000 or more; 1 story, 100x200 ft., citrus and vegetable packing plant, $40,000; water sys., over $15,000. CD 4/4—ENR 4/12.

LOW BIDDERS

Md., Elkton—CHARGING STATION, etc.—Triumph Explosives Inc., Elkton, Apr. 4, palletizing project, from Ernest DiSabatini & Sons, 839 Tatnall St., Wilmington, Del., $68,950. CD 3/26—ENR 3/29.

CONTRACTS AWARDED

Conn., Bridgeport—FACTORY—Locke Steel Chain Co., 1085 Connecticut Ave., 1 story, 100x250 ft. pickling plant, 100x200 ft. furnace unit, both brick, concrete, steel, to Gellatly Constr. Co., 25 Housatonic Ave. Est. $255,000. Westcott & Mapes, Inc., 139 Orange St., New Haven, engrs.

Kan., Hillsboro—CREAMERY, etc.—Central Kansas Cooperative Creamery Assn., H. Hansen, mgr., Hillsboro, creamery bldg., warehouse, boiler house, to Martin Dondlinger, Box 2033, Wichita, $208,220. L. Schmidt, 1832 E. 2 St., Wichita, archt.

Kan., Topeka—PLANT—Delbert Wheeler, 17 and West Sts., Sioux Falls, S. D., limestone plant, to M. W. Watson, National Bank of Topeka Bldg., approx. $40,000

Me., Millinocket—COAL STORAGE SHEDS, etc.—Bangor & Aroostock R.R. Co., W. J. Strout, ch. engr., Houlton, 1 story, 45x270 ft., coal storage sheds, and 15x80 ft. sand house, to T. W. Cunningham, Inc., 84 Harlow St., Bangor. Est. $42,500.

Md., Baltimore—POWER PLANT—Crown Cork & Seal Co., Eastern Ave. and Kresson St., salvage power plant, to Consolidated Engineering Co., 20 E. Franklin St.

Mass., Cambridge—PLANT BLDG., etc.—Boston & Maine R. R., T. H. Sughrue, ch. engr., 150 Causeway, Boston, brick, frame locker unit, etc., to Marson Constr. Co., 88 Kent St., Somerville, $41,500; sewer connections, to R. Sullivan, 32 Mt. Pleasant St., Cambridge.

Mass., Cambridge—FACTORY—Dewey & Almy Chemical Co., 62 Whittemore Ave., 1 story, 120x220 ft., brick factory, to Leslie C. Blake Constr. Co., 50 Dyer Ave., Milton. Est. over $40,000.

Mass., Gloucester — COLD STORAGE — North Shore Ice & Cold Storage Co., S. Handler, agt., 191 Main St., 1 story, 200x200 ft. cinder block cold storage bldg., concrete fdn., to Tredennick-Billings Co., 10 High St., Boston, approx. $40,000 incl. equip. F. M. Gill, 1 Gloucester Ave., archt. CD 3/15—ENR 3/22.

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INDUSTRIAL BLDGS. (Contracts Awarded Cont'd.)

Mass., Hyannis—WAREHOUSE—Cape Cod Farms, Inc., West Barnstable, 1 story, ware-house addn., day labor. To exceed $40,000. W. M. Gaffney, 43 Potter St., archt.

Me., Sangerville — MILL — Sangerville Woolen Co., Sangerville, 1 story, 20x70 ft., 3 story 15x55 ft. addns. Carleton Mill, to A. Kenney & Son, 67 Bowdoin St., Bangor. Est. $40,000. CD 1/12—ENR 1/18.

Mich., Dearborn — PLANT — Hydraulic Machinery Co., 12825 Ford St., 1 story, brick, steel, concrete plant, to Campbell Const. Co., 3255 Goldner Ave., Detroit. Est. $100,000. Wright & Wright, 120 Madison Ave., Detroit, archts.

★ **Mich., Detroit**—PLANT—Murray Corp. of America, 7700 Russell St., design and construction, 4 brick, steel, concrete, transmission plant bldgs., to Austin Co., 42 Curtis Bldg. Est. $500,000.

Mo., St. Louis—FREIGHT TERMINAL—Fat's Express Co., 501 S. Second St., Zone 1, 1 story, 35x100 ft., brick, concrete freight terminal, 724 Carr St., to Murch-Jarvis Co., 718 Locust St., Zone 1. Est. $40,000 incl. equip.

N. Y., Amsterdam—BOILER HOUSE—Mohawk Carpet Mills, Amsterdam; new boiler house, to Turner Constr. Co., 420 Lexington Ave., New York, Zone 17. Syska & Hennessy, 144 E. 39 St., New York, engrs.

N. Y., Farmingdale—PLANT—Ranger Aircraft Engine Co., Conklin St., plant alterations, to Harold J. Ryan Inc., 101 Park Ave., New York, N. Y., $45,000. Awarded 4/6. Eggly Engineers, 1500 Walnut St., Phila., Pa., engrs.

★ **Pa., Brave**—POWER PLANT—Peoples Natural Gas Co., J. J. Jacob, Jr., vice pres. and genl. mgr., 545 Wm. Penn Way, Pittsburgh, general contract building erection, power plant at owner's compressing station, steel frame and transit siding, to J. M. Baldwin, Whitfield Bldg., Pittsburgh; general contract power division, to Dravo Corp., 302 Penn Ave., Pittsburgh. Est. $1,000,000.

Pa., Monessen—PLANT—Pittsburgh Steel Co., J. Anderson, vice pres., J. H. Phillips, purch. agt., Monessen, truck bead wire plant, own forces. $135,000 incl. equip.

Pa., Johnstown — BAKERY — American Stores Co., 424 N. 19 St., Phila., bakery alterations, remodeling, own forces. $92,500.

Pa., Marcus Hook—MANUFACTURING—General Chemical Co., 40 Rector St., New York, N. Y., rehabilitation mfg. bldgs., to Rupert Constr. Co., 1509 Franch St., Wilmington, Del. Est. $120,000. Bids 2/15, awarded 4/5. CD 2/14—ENR 2/22.

R. I., Cranston—FOUNDATIONS, etc.—Atlantic Tubing & Rubber Co., Mill St., foundations, rigging and erection 84 in. rubber mills, large presses and calenders, Mill St., to Henry M. Soule Co., 110 Armistice Bldg., Pawtucket. Bids 3/20. CD 3/9—ENR 3/15.

★ **Tenn., Chattanooga** — FACTORY — Mohawk Rubber Co., 1235 2nd St., Akron, O., rubber tire factory, to Clemmer Constr. Co., 134 E. Thornton St., Akron, O., approx. $2,250,000. Robert & Co., Bona Allen Bldg., Atlanta, Ga., engrs.

Tex., Beaumont—PLANT—Jefferson Packing Co., Beaumont, plant reconstruction. Owner builds. $75,000. CD 1/9—ENR 1/11.

Tex., Dallas — PLANT — Diamond Alkali Co. of Texas, S. Lamar and Lenway Sts., steel, corrugated iron, concrete, etc., plant addn., to Cedric Burgher Constr. Co., 3027 Main St., approx. $50,000. CD 4/11.

Wash., Toppenish—PLANT—Utah-Idaho Sugar Co., Box 752, 3 story, 23x137 ft., brick, beet sugar plant addn., with conveyor, belt conveyors, pulp dryer units, water sewer and steam pipes, to Stearns-Roger Mfg. Co., 1720 California St., Denver, Colo. Est. $150,000. CD 4/11.

Tex., Orange—PLANT—Kemso Chemical Products, Inc., 1203 Milby St., Houston, 45x180 ft., and 20x80 ft., steel galvanizing plant, own forces. Approx. $65,000. CD 2/28—ENR 3/8.

Tex., Raymondville — PLANT — Central Power & Light Co., 222 E. Hidalgo St., ice plant unit, rein.-con., brick force account. Approx. $40,000. CD 4/4—ENR 4/12.

Wis., New Berlin (Waukesha P.O.)—WAREHOUSE—J. G. Van Holten, 3233 N. 31 St., Milwaukee, Zone 10, 1 story, 50x175 ft., concrete, steel warehouse, to S. M. Byrne Constr. Co., 3100 W. Burleigh St., Milwaukee, Zone 10. J. Topzant, 424 E. Wells St., Milwaukee, Zone 2, archt.

Wis., West Allis (br. Milwaukee)—SHOP—Allis Chalmers Mfg. Co., 1126 S. 70 St., Zone 14, 1 story, 60x502 ft., steel, brick pattern shop bldg. addn., and brick, steel foundry and pattern shop office alterations, to Meredith Bros. Inc., 121 E. Washington St., Milwaukee, Zone 4. Est. $98,000. C. E. Meyer, c/o owner, archt. CD 1/16—ENR 1/18.

Wis., Green Bay—PLANT—Atlas Annex Inc., Morrow St., 3 story, bamnt, cheese processing plant, brick, structural steel, rein.-con., concrete fdn., to Selmer Co., Northern Bldg. R. W. Surplice, City Center Bldg., archt.

Wis., Green Bay—FACTORY—Green Bay Drop Forge Co., 1341 S. State St., 1 story, 40x82 ft. and 18x65 ft., steel factory addns., concrete fdns., to Selmer Co., Northern Bldg. R. W. Surplice, City Center Bldg., archt.

Wis., Eau Claire—FACTORY—U. S. Rubber Co., 1230 6 Ave., New York, N. Y., 6 story, bsmnt., 135x200 ft., rein.-con., steel, brick tire factory, to Geo. A. Fuller Co., 111 W. Washington St., Chicago, Ill.

Wis., Green Bay—STORAGE—Accredited Cheese Co., 161 W. Pear St., 3 story, 54x70 ft. cheese storage bldg., rein.-con., brick, concrete fdn., to Selmer Co., Northern Bldg. R. W. Surplice, City Center Bldg., archt.

Wis., Wausau—FACTORY—Marathon Battery Co., 840 Henrietta St., 1 story, 70x100 ft., 40x120 ft., brick, steel, factory addn., concrete fdn., to J. P. Doheny, 918 Kickbusch St. G. Foster, Jr., 327 3 St., archt.

UNCLASSIFIED

PROPOSED WORK

★**†Fla., Morrison Field (br. West Palm Beach)**—AIRFIELD BLDGS., etc.—U. S. Eng., Post Office Bldg., Savannah, Ga., addnl. facilities, incl. housing for 600 enlisted men, altering 2 south hangars and area, access and service roads, addnl. concrete apron, 26 engine change docks, addnl. bldgs. at southeast apron, etc. $1,100,000.

★**†Md., Camp Springs** — AIRFIELD IMPROVEMENTS—U. S. Eng., 21 St. and Virginia Ave. N.W., Wash. 25, D. C., roads, sidewalks, automobile parking areas, electrical distr. sys., water, sewers, etc., new north-south runway, necessary taxiways, parking apron, exten runways and necessary dust and erosion control measures, Andrews Field.

BIDS ASKED

Bids Asked After April 10

†Tex., Van Horn—AIRPORT SEEDING, etc.—Civil Aeronautics Admin., P. O. Box 1689, Fort Worth, Zone 1, seeding, mulching, etc., at airport, Proposal No. 44-45-5006.

Bids Asked April 24

Mass., Chatham—PIER—Town, Bd. Selectmen, Town Hall, Contr. 1, 105 ft., fish pier, 50 ft. wide, wood sheet piling, foot of Briarcliff Ave. Extended date. Edward Sears Read & Assoc., 177 State St., Boston, archts. H. E. Bailey, 177 State St., Boston, engr. CD 3/23—ENR 3/29.

Bids Asked April 25

Pa., Harrisburg—AIRPORT BLDG.—C. M. Woolworth, secy. Dpt. Prop. and Supplies, generator bldg., for Harrisburg Airport also electrical construction and relocation emergency lighting Plans deposit $2.50.

Pa., Mayview—COAL MINE ESCAPEWAY, etc.—C. M. Woolworth, secy. Dpt. Property and Supplies, Harrisburg, coal mine escapeway and airshaft at Mayview State Hospital. Plans deposit $2.50.

Bids Asked April 26

†Tex., Kelly Field—AUTOMATIC SPRINKLER SYSTEMS—U. S. Eng., Fort Sam Houston, automatic sprinkler sys. in 6 warehouses, San Antonio Air Depot, Group B, Ser. No. W-41-154-45-114.

Bids Asked April 27

†Ala., Montgomery — AUTOMATIC SPRINKLER SYSTEMS—U. S. Eng., Grant St. west of Westwood St., Mobile, Zone 7, installing automatic sprinkler sys. in Warehouses 1 to 6 (inclusive) at Montgomery Holding & Reconsignment Point Depot, Ser. 01-076-45-272.

Bids Asked May 2

†Fla., Panama City — AUTOMATIC SPRINKLER SYSTEM—U. S. Eng., Grant St. west of Westwood St., Mobile 7, Ala., installing automatic sprinkler sys., in Station Hospital, at Tyndall Field, Ser. No. 01-076-45-277.

Bids Asked May 3

†Ala., Tuscaloosa—AUTOMATIC SPRINKLER SYSTEM—U. S. Eng., Grant St. west of Westwood St., Mobile, Zone 7, installing automatic sprinkler sys., in Library, Type LIB-B-H, at Northington General Hospital.

Bids Asked May 10

New Jersey—PARK—Palisades Interstate Park Comn., Bear Mountain, N. Y., removal and cleanup slides consisting rock and earth, on Henry Hudson Drive, in New Jersey Section of Palisades Interstate Park; adv. ENR 4/19.

Texas and Louisiana—TELEPHONE LINE—United Gas Pipe Line Co., 1525 Fairfield Ave., Shreveport, La., 140 mi. pole telephone line between Carthage, Tex. and Monroe, La., $75,000. CD 3/21—ENR 3/29.

LOW BIDDERS

†Mass., Camp Edwards—FIRE PROTECTION—U. S. Eng., 31 St. James Ave., Boston, fire protection, 19-023-45-Neg-113, from Rockwood Sprinkler Co., 141 Milk No. St., Boston, Sect. 1, **$45,708**; from Automatic Sprinklers Corp. of America, 89 Broad St., Boston, Sect. 2, **$50,657.**

†Tex., Fort Sam Houston — SPRINKLER SYSTEMS—U. S. Eng., Fort Sam Houston, installing automatic sprinkler sys. in one hundred five 2 story ward bldgs., Ser. No. 41-154-45-106, from Century Sprinkler Corp., 305 Graham St., Richmond, Va. **$95,900.** CD 4/3.

★**N. Y., Idlewild**—ELECTRIC CONDUITS—Dpt. Marine & Aviation, Pier A, North River, New York, Zone 4, Apr. 12, underground electric conduits at airport, from Plymouth Electric Co., 21 E. 40 St., New York, Zone 17, **$508,000.** CD 4/9.

†N. C., Greenville—AIRPORT IMPROVEMENTS—Civil Aeronautics Admin., 84 Marietta St. N.W., Atlanta, Ga., filling of washes, constructing berms, repairing fence, addnl. spillways, fertilizing, seeding at airport. Prop. 25-295, from E. H. Hines, Greenwood, S. C., **$32,145.** CD 4/3—ENR 4/5.

†Tex., Fort Worth—HANGARS, etc.—U. S. Eng., 231 W. Main St., Dennison, Apr. 10, hangars and washracks, Ser. 41-242-45-119, from Robert E. Mckee, P.O. Box 2848, Dallas, Sect. A, **$247,900**; from Texas Bitulithic Co., P.O. Box 5297, Dallas, Sect. B, **$154,000.**

†Tex., Kelly Field—AUTOMATIC SPRINKLER SYSTEMS—U. S. Eng., Fort Sam Houston, Apr. 12, automatic sprinkler sys. in 6 open sheds, from Raisler Sprinkler Corp., 129 Amsterdam Ave., New York, N. Y., **$242,000.** CD 4/3—ENR 4/5.

CONTRACTS AWARDED

Conn., Greenwich — PARK IMPROVEMENTS—Town, Bd. Selectmen, Town Hall, park imprvs. Greenwich Point (Tod's Point), clear areas near beach, constructing parking space, etc. Owner builds **$90,000.** A. Blodgett, Town Hall, engr.

★**†Md., Camp Springs**—AIRFIELD BLDGS.—**U. S. Eng., 21 St., Virginia Ave. N. W.,** Wash. 25, D. C., bldgs., Andrews Field, to Harwood-Nebel Constr. Co., 1520 K St. N.W., Wash., D. C., **$4,500,000.** CD 4/11.

†Ore., Hermiston—POWER LINES—U. S. Eng., Pittock Block, Portland, permanent power lines, appurtenant facilities at Umatilla Ordnance Depot, Neg. 1041, to Boynton-Graham Electric Co., 24 N.W. Bway., Portland, **$25,781.** Bids 4/2.

†Pa., Phila.—FIRE ALARM SYSTEM—U. S. Eng., Standard Oil Bldg., Baltimore, Md., fire alarm sys. at Hog Island, to Howard P. Foley Co., 1630 Pine St., Phila., **$27,400.** Awarded 4/6. CD 3/7—ENR 3/15.

R. I., Newport—BEACH IMPROVEMENTS—Hazard Beach Subscribers, J. J. Sullivan, chn., 20 Pelham St., Hazard Beach imprvs., rebuilding bathhouse and administration bldg., to O. Ahlborg & Sons, Inc., 97 Friendly Rd., Cranston, **$27,000.** Wiggans & Van Allen, Phila., Pa., archts.

†Tex., Denton—AIRPORT—Civil Aeronautics Admin., P.O. Box 1689, Fort Worth, airport, Proj. 4-45-2967, to Farrell Contg. Co., 1607 Wynne Ave., St. Paul, Minn., **$224,755.** Awarded 4/9. CD 3/21—ENR 3/29.

Postwar Projects see p. 122

FOR PROPOSAL ADVERTISING
(See pages 168 and 187)

EMPLOYMENT

POSITIONS VACANT

FIRE PROTECTION Engineers and inspectors. Technical graduates, especially chemical and electrical; civil, mechanical, metallurgical also considered. Inspect and consult industrial plants to prevent fires, explosions, and other casualties. Considerable travel and report writing; interesting work offering permanency. Engineering experience necessary. Salary open. Well-known national organization with openings at Cleveland, Chicago, and other district centers. Men under 34 years of age cannot be considered. Please send a photograph when applying. P-205, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

WANTED IMMEDIATELY Mechanical Engineer, experienced in design and construction of light machinery and equipment; must also be a fast and capable draftsman. Mechanical draftsman, capable of development design sketches of small machinery and plant layout. Transportation of self and family furnished, housing available. Employment Department, Certain-teed Products Corporation, Prime Contractor Pantex Ordnance Plant, Amarillo, Texas.

ARCHITECTURAL DRAFTSMAN and engineer wanted by Southern firm engaged in industrial construction. Need men capable of following through on preliminary sketch completed projects. Salary from $3,500.00 to $5,200.00 per year to start. Thomas Bryan & Associates, Inc., P. O. Box 46, Lafayette, Louisiana.

ELECTRICAL ENGINEERS with experience in lighting and power for manufacturing buildings and electrical distribution systems, such as telephone and power. Southern location. Time and a half for overtime over 40 hours. Partly war job and partly post-war. Permanent position for the right man. State age, education, salary requirements, draft status. P-247, Engineering News-Record, 300 W. 42nd St., New York 18, N. Y.

JUNIOR ENGINEER to learn centrifugal pump application engineering. Good post-war future. Economy Pumps, Inc., Hamilton, Ohio.

SIX STRUCTURAL civil engineers with technical civil engineering degrees and required immediately. Applicants should have designing, estimating and detailing experience in reinforced concrete structures. State age, experience and training in detail and providing evidence of availability under War Manpower Commission regulations. P-248, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

WANTED: SANITARY and structural designer-draftsmen, thoroughly experienced in water purification plant and sewage treatment plant design. Work on drafting board. Send synopsis of training and experience including references, representative samples of design and draftsmanship, salary desired and earliest date could report for employment in consulting engineers office. Location North Carolina. WMC regulations apply. P-250, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

WANTED: Eight designing engineers for dirt moving equipment. Give complete information and references. P-233, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

STRUCTURAL DESIGNER
Experienced in design of structural steel and concrete railroad bridges.

STRUCTURAL DETAILER
Qualified to prepare finished construction drawings for structural steel and railroad bridges.

State age, nationality, education, experience in detail and references. Salary commensurate with ability and experience. If you are now employed in an essential industry at your highest skill do not apply. Write or wire

P-259, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

GRAIN ELEVATOR engineer wanted. Must know grain elevator trade and be thoroughly experienced in layout of grain handling equipment and concrete elevators. Give full personal history record. Permanent position. P-246, Eng. News-Record, 520 N. Mich. Ave., Chicago, Ill.

WANTED, GENERAL Construction superintendent with experience in estimating cost analyses, field organization and supervision for large scale single and multiple housing projects in Ohio. State age, education, experience, draft classification and references. Send photo, P-238, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

STRUCTURAL ENGINEERS— thoroughly experienced in structural steel and reinforced concrete design for engineering promotional and educational work, with long established organization. Permanent position and good opportunity for qualified men. Location New York State. P-243, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

(Continued on page 170)

Large Construction Company Desires

General Superintendent

Capable of taking complete charge extensive projects abroad.

Must have had responsible charge large construction works and experience in organizing and equipping such operations.

Give full details of experience, references, etc. in application.

P-279, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

THE MOST FOR THE MONEY — SPEED - EFFICIENCY - ECONOMY

CONSTRUCTION BY CONTRACT

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC. · MUNSEY BLDG., WASH. D.C.

OFFICIAL PROPOSALS

Bids: May 5 (373)

Wash-Water, Transfer, and Sludge Pumps, Piping and Crane

SOUTH DISTRICT FILTRATION PLANT
DEPARTMENT OF PUBLIC WORKS

CHICAGO, April 5, 1945.

SEALED PROPOSALS will be received by the City of Chicago until 11 A.M. (Central War Time) Thursday, May 3, 1945, at Room 406 City Hall, at which time and place all such proposals will be opened publicly and read, for designing, fabricating and furnishing all labor, materials, tools and services necessary for the construction and installation of Wash-Water Pumps, Sludge and Wash-Water Transfer Pumps, Pipe and Crane for the South District Filtration Plant, located in the vicinity of East 79th Street and Lake Michigan, Chicago, Illinois, according to plans and specifications on file in the office of the Department of Public Works of said City, Room 406 City Hall.

The work to be done according to Divisions is as follows:

Division "A"...Constructing, furnishing and delivering Horizontal Centrifugal Pumping units and appurtenances of the horizontal, single-stage, split-case double suction type.

Division "B"...Constructing, furnishing and delivering Vertical Centrifugal Pumping units of the double suction, single-stage, split-case vertical-shaft type.

Division "C"...Constructing, furnishing and delivering Horizontal Centrifugal Sludge Pumps of the horizontal, end (single) suction type.

Division "D"...Designing, constructing, furnishing and delivering a Deep Well Turbine Pump of the vertical-shaft turbine type.

Division "E"...Fabricating, delivering and erecting a Ten (10) Ton combination hand and electric Traveling Crane in the west pump room.

Division "F"...includes erecting of all the Pumps included under Divisions A, B, C and D; also the furnishing, delivering and erecting of Piping and miscellaneous equipment.

Contractor may bid on separate or all Divisions.

Proposals must be made out upon blanks furnished at said office of the Department of Public Works and be addressed to said Department, indorsed "Proposal for Wash-Water, Transfer, and Sludge Pumps, Piping and Crane, South District Filtration Plant," and be accompanied by the following deposits:

Division A, B, and E.....$400.00 Each
Division C ..... 200.00 Each
Division D ..... 100.00 Each
Division F .....$5,000.00 Each

in money or a certified check for the same amount on some responsible bank located and doing business in the City of Chicago and made payable to the order of the Commissioner of Public Works.

Plans and specifications may be obtained upon payment of Twenty-five ($25.00) Dollars for each set of plans and specifications and Five Dollars ($5.00) for specifications only, which will be refunded upon the return of said plans and specifications in good condition within thirty (30) days after the opening of the bids. Deposits to be in the form of money or certified check.

In accordance with the provisions of the Act of the General Assembly of the State of Illinois, entitled "An Act regulating wages of laborers, mechanics and other workmen employed under contracts for public works," approved June 26, 1941, the general prevailing wage rates for work at the construction site are set forth in the specifications.

The Commissioner of Public Works reserves the right to reject any or all bids.

No proposal will be considered unless the party submitting the same shall furnish evidence satisfactory to the Commissioner of Public Works of ability and the possession of the necessary facilities, together with sufficient pecuniary resources, to fulfill the conditions of the contract and specifications.

OSCAR E. HEWITT
Commissioner of Public Works

OFFICIAL PROPOSALS

Bids: May 10 (378)

Removal of Rock, etc.

Sealed bids will be received by the Palisades Interstate Park Commission, Bear Mountain, New York, at 11:00 A.M. Thursday May 10th, 1945, for the removal and cleanup of slides consisting of rock and earth (approximately 300 cubic yards) on Henry Hudson Drive in the New Jersey Section of the Palisades Interstate Park. Materials to be hauled to shore paths and there dumped to form sea wall and fill. Information and bid forms may be obtained by appointment at the Administration Building, Route 9W and Yonkers Ferry Approach —New Jersey Section of the Palisades Interstate Park. Telephone Closter 1360. The Commission reserves the right to reject any or all bids received.

OFFICIAL PROPOSALS

Bids: April 27 (374)

Elevated Steel Tank

WASHINGTON SUBURBAN SANITARY COMMISSION

Contract No. 185-W

Sealed proposals for furnishing materials for and erecting a welded steel elevated tank for storing water, including foundations, of 500,000 gallons capacity, and having a head range of 25 feet with the overflow 124.5 feet above the foundations, will be received at the office of the Washington Suburban Sanitary Commission, Hamilton Street, Hyattsville, Maryland, until 3:00 P.M., Friday, April 27, 1945, at which place and time they will be publicly opened and read.

Plans and specifications may be obtained from Harry R. Hall, Chief Engineer of the Commission, Hyattsville, Maryland.

Perry Boswell
J. Donald Clagett
Frank B. Smith
Commissioners

Additional Official Proposals continued on page 187

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Dayton 9-7474

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Telescope 12" long, 25 power—Horizontal Circle 4½" with vernier to 5 minutes—Vertical Arc 3"—Clamp and Tangent Screw for Vertical and Horizontal Limb—Instrument weighs 11 pounds, tripod 9 pounds.

Price complete with Tripod, Carrying Case, Sunshade, and Dust Cap $115.00. Can be furnished with a compass at $12.50 extra—Stadia Wires $5.00 extra.

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